Prepared by the
Interlake Bloc Planning Committee

for the
Crown Land Classification Committee

Manitoba

OCTOBER, 1984

# Washow-Fisher Peninsula Land Use Study

# Background Report

# ACKNOWLEDGEMENTS

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*cover design: H. Schell*

# PROLOGUE: EVALUATION AND SUMMARY

## Agriculture

Within the Washow-Fisher Peninsula Study Area, there is a total land area of approximately 213,000 hectares (527,000 acres) of which 108,000 hectares (270,000 acres) have been identified as having potential for future agricultural expansion.

The majority of the area identified as having potential for agriculture (approximately 85 percent) lies within a Class 1 subclimatic region. Within this area there are no significant limitations for regionally adapted crops and the productivity of crops and livestock is expected to be comparable to that of adjacent agriculturally developed areas. The remaining 15 percent of the area identified for agriculture lies within a 2H subclimatic region which has moderate limitations for regionally adapted crops. Forage crops are expected to produce at normal levels under these conditions but the higher risk of frost will increase the risk in growing cereal crops. There are no major limitations for livestock production but possible predatory pressures, particularly from wolves and bears as well as insect pests can be expected.

There are approximately 59,000 hectares (147,000 acres) of mineral soils and 49,000 hectares (123,000 acres) of organic soils within the area identified as having potential for future agricultural expansion. Although there are soils arable in their native state, a major consideration for the study area would be the provision and maintenance of an adequate drainage system. To reduce the costs of infrastructure, the major drains could follow the pattern which the soils occur in and the associated roads and utilities could then correspond with the drains.

Demand for the area is expected to come from local farmers as well as from southern Manitoba farmers. There is little or no expansion potential remaining in the areas presently utilized for agricultural purposes. This, combined with high land prices, increases the attractiveness of this area for those looking for a land base to farm. Northern Manitoba represents one of the five important areas in Canada having untapped potential for arable uses.

The development of land will be dependent upon the general economic conditions of the times, the availability of funding, and the returns which can be expected. The agricultural attractivensss of this area would improve as the economic conditions improve. The major costs of infrastructure and capital requirements are somewhat offset by the benefits which can be expected. The total value of production is estimated at $21,124,000 per annum with a spinoff effect to the economy estimated at $37,505,663 per annum.

## Fisheries

The Lake Winnipeg portion of the Washow-Fisher Peninsula study area contains a major pickerel/sauger commercial fishery. In addition small permit fisheries and trout farms occur. Recreational angling is presently underdeveloped. Areas of significant fish habitat include Lake Winnipeg, the Fisher River and numerous small lakes and streams within the study boundaries. The shorelines of these areas require protection. Private investment in the fishery is limited. Access to the fishery is good. Demand on the resource is high. The major concern is to protect and retain the present high water quality and the integrity of the existing fisheries habitat.

## Forestry

The Washow Bay-Fisher Peninsula Land Use Study Report identifies the importance to forestry of approximately 134,000 hectares of unencumbered Crown owned forest land. This forest land base has to be secured for long term forest management in order to provide an adequate resource base for existing and future harvest operations. The importance of these lands is summarized by the following points.

Economic significance of the forest industry in the area currently to Provincial economy is $283,000 per year. Optimum utilization of the annual allowable cut (AAC) would inject in excess of $3,820,000 to the Provincial economy per year. Additional jobs would also be created for forest management and renewal efforts.

The 1977 Riverton Fire destroyed vast quantities of merchantable timber subsequently reducing the AAC within the study area. The AAC will be recalculated after 20 and 40 years and will most likely be increased as long as the burn area has been restrocked naturally and/or artificially. This potential increase in AAC will increase the economic significance of this area.

The establishment of a provincial forest would help in reaching the goals as identified by the 20 year forest management plan for the Province of Manitoba and would alleviate concerns regarding future alienation of forested lands and protecting all public and private investments.

The Province has a commitment to Abitibi-Price Inc. to maintain the area as IWSA #2 to meet Abitibi's short and long term demands for wood fibre. Commitments also exist to five other timber allocation holders and two communities to supply them with wood fibre.

The importance of IWSA #2 has become even more important during the past several years to Abitibi-Price Inc. because large area allocations have been made in critical timber supply areas of productive forested land to other uses where such allocations exclude timber harvesting. Also, the 1980 and 1983 fire seasons on the east side of Lake Winnipeg have reduced the volumes of softwoods available for timber harvesting.

The study area because of its accessibility and proximity to market, will experience a level of demand for forest products and subsequently industrial growth greater than the Provincial average of two to three percent annually.

The hardwood resources of the area will be utilized in the future and therefore will play an important role to the establishment of new industry.

Without a long term commitment to forestry use, there is reluctance to spend Provincial funds in reforestation and management which is a requirement for long term stability of wood fibre volumes for industry use. There is and will be a reluctance to expand forestry operations in the area if the land base is not protected for long term forestry use.

## Outdoor Recreation

Recreational facilities in the study area consist of one park and two cottage subdivisions. Camping and picnicking occur at the park and near the cottage subdivisions. Extensive forms of recreation, often involving hunting and fishing, are widespread over the entire study area. Recreational use is expected to continue in a similar pattern.

## Wildlife

The Washow Bay-Fisher Bay Peninsula is comprised of a great variety of habitat types supporting an abundance and diversity of wildlife species. Wildlife and the users of wildlife are important considerations within the Study Area.

A large portion of the Study Area consists of CLI Classes 1, 2, and 3 wintering habitat for moose. As a result, the area supports one of the most productive moose herds in the Province. If managed for moose, the area could support up to 0.8 moose per square kilometre while providing substantial annual benefits to Manitobans in the form of moose hunting. It is recommended that a Moose Management Area be established in a portion of the Study Area to maintain this important moose population.

The Study Area is well known for the concentrations of staging waterfowl that occur each spring and fall. Much the same areas provide breeding habitat for a variety of waterfowl, most notably Giant Canada Geese and Sandhill Cranes. It is important to protect the prime breeding areas from disturbance to maintain breeding populations of these species within this portion of the Interlake.

Agricultural development (particularly croplands) in the vicinity of the major waterfowl staging areas is highly prone to crop damage by waterfowl.

Similarly, livestock damage by timber wolves and other predators is likely to occur as development encroaches into the remote areas. Plans for agricultural development should consider these two factors as problems currently exist with agricultural producers in the marginal farming areas both in and adjacent to the Study Area.

As the peninsula to this point in time has remained relatively inaccessible and there has been little conflicting land use, the variety and abundance of wildlife is remarkable. This will change though, unless adequate consideration is given to fragile species and unique habitats while planning for future development in the Study Area.

# PREFACE

In 1982, the Forestry Branch of the Department of Natural Resources initiated the idea of creating a provincial forest on the Washow-Fisher Peninsula. Due to the complexity of the various land uses and users, the Crown Land Classification Committee has undertaken at the direction of the Provincial Land Use Committee of Cabinet an overall land use study for the area.

The purpose of the study is to develop and prepare a Provincial Crown Land Use Classification Plan and associated operational Crown land plan which rationalizes and allocates the Crown land and natural resources of the area in a manner which will recognize.

a) existing land capability and suitability
b) present and future development potential
c) unique and rare resources
d) present and future demands in the area for land and resources, and
e) present commitments

No attempt will be made to incorporate into the plan present and future provincial and national economic conditions which may directly or indirectly affect land and resource demand, development capability and changing social factors and conditions. However, economic costs of all resource development and the incremental nature of agricultural development and expansion in Manitoba's agricultural/pioneer fringe is recognized.

The purpose of this Background Report is to describe, delineate and synthesize in report format that information, and those issues, conflicts and agreements basic to a land use study whose purpose is the allocation-classification of Crown land and resources (Crown Land Classification Committee 1983:4).

This Background Report has been prepared as directed by and under the authority of the Crown Land Classification Committee by the Interlake Bloc Planning Committee.

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# SECTION 1. GENERAL DESCRIPTION OF THE STUDY AREA

## The Study Area

The Washow-Fisher Peninsula study area borders the shores of Washow Bay, Lake Winnipeg and Fisher Bay (Map 1). Most of the islands (Moose, Little Moose and Tamarach Islands) at the north end of the study area are included. The western boundary is located between ranges 1 east and 1 west with the southern boundary the top of township 24 (Appendix 1).

The southern boundary is approximately 125 kilometres (78 miles) north of Winnipeg while its northern boundary is about 197 kilometres (124 miles) north of Winnipeg. Provincial Road #234 runs north-south along the east side and Provincial Road #325 runs west near the southern boundary, while #224 runs through Indian Reserve #44. In addition to these Provincial roads, the Department of Natural Resources maintains two resource extraction roads, the Sisterline and the Fish River roads. These forestry roads provide seasonal access to the south half of the study area.

The R.M. of Bifrost extends into the study area covering the southern two townships from west to east.

There are ongoing land drainage and flood control studies adjacent to the area which may have an impact on future land use within the study area.

## Population

The major populated centers in the study area are the two Indian Reserves, Peguis and Fisher River as well as the hamlets or settlements of Matheson Island, Pine Dock, Fisher Bay and Koostatak, Map 2. The total population of the study area is approximately 1,440 persons.[1]

Agriculture settlement dominates the south portion of the study area. The population density of the southern end ranging from 1.0 to 1.4 persons per square kilometre (2.5 - 3.5 people per square mile) (Weir 1983).

As the area is situated principally in an unorganized portion of the Province much of the population affected is located outside the study boundaries. There is an additional population of 5,138 persons within 20 kilometres of the study area boundary.[1] This population occurring principally in the hamlets of Dallas, Red Rose, The Halfway, Hodgson, Sylvan, Rosenburg, Okno, Shorncliffe, Washow Bay, Riverton, Vidir, Ledwyn, Zbaraz, Broad Valley, Fisher Branch, Harwell and Jackhead.

## Land tenure and Crown Land Commitments

The study area exclusive of Lake Winnipeg occupies an area of about 213,000 hectares (527,000 acres). Of the 213,000 hectares, 197,000 are Crown land, the remaining 16,000 hectares are private lands located primarily in the southern portion of the study area.

Patented land and Indian reserves are not considered part of the study.

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[1] Statistics Canada, as of June 1, 1983

Within the study, Crown land has been committed by Order-in-Council to a number of specific uses, such as the Lee Lake Wildlife Management Area, the Sylvan Dale Community Pasture, Beaver Creek Provincial Recreation Park, and Beaver Creek and Leaside Beach Recreation Subdivisions. These designated uses are accepted land uses within the area. In addition to these designated land uses the entire study area is part of Abitibi's Integrated Wood Supply Area #2 which was established as part of a timber supply area under agreement between Manitoba and Abitibi-Price Inc. A large portion of the area is within the Lake Winnipeg Water Power Storage Reserve and the northern part of the peninsula starting at Township 29 is the Bullhead registered trapline (Map 3).

There are approximately 13,100 hectares of Crown land under agricultural lease and permit along with 6,000 hectares under timber sale. Four thousand hectares are under mineral quarry lease, mining claim and exploration permit. There are approximately 30 fish camps in the study along with 51 general permits (including vacation home and lighthouse sites). There are also eight wild rice licences issued in the area. Wild rice production is relatively new and although production has been relatively low interest is expanding (Map 4).

## Climate

In relation to worldwide climate conditions the study area has high summer and annual temperatures, winter temperatures are lower, and the annual temperature range is greater than world average for this latitude. The area is subhumid and has a definite summer maximum of precipitation.

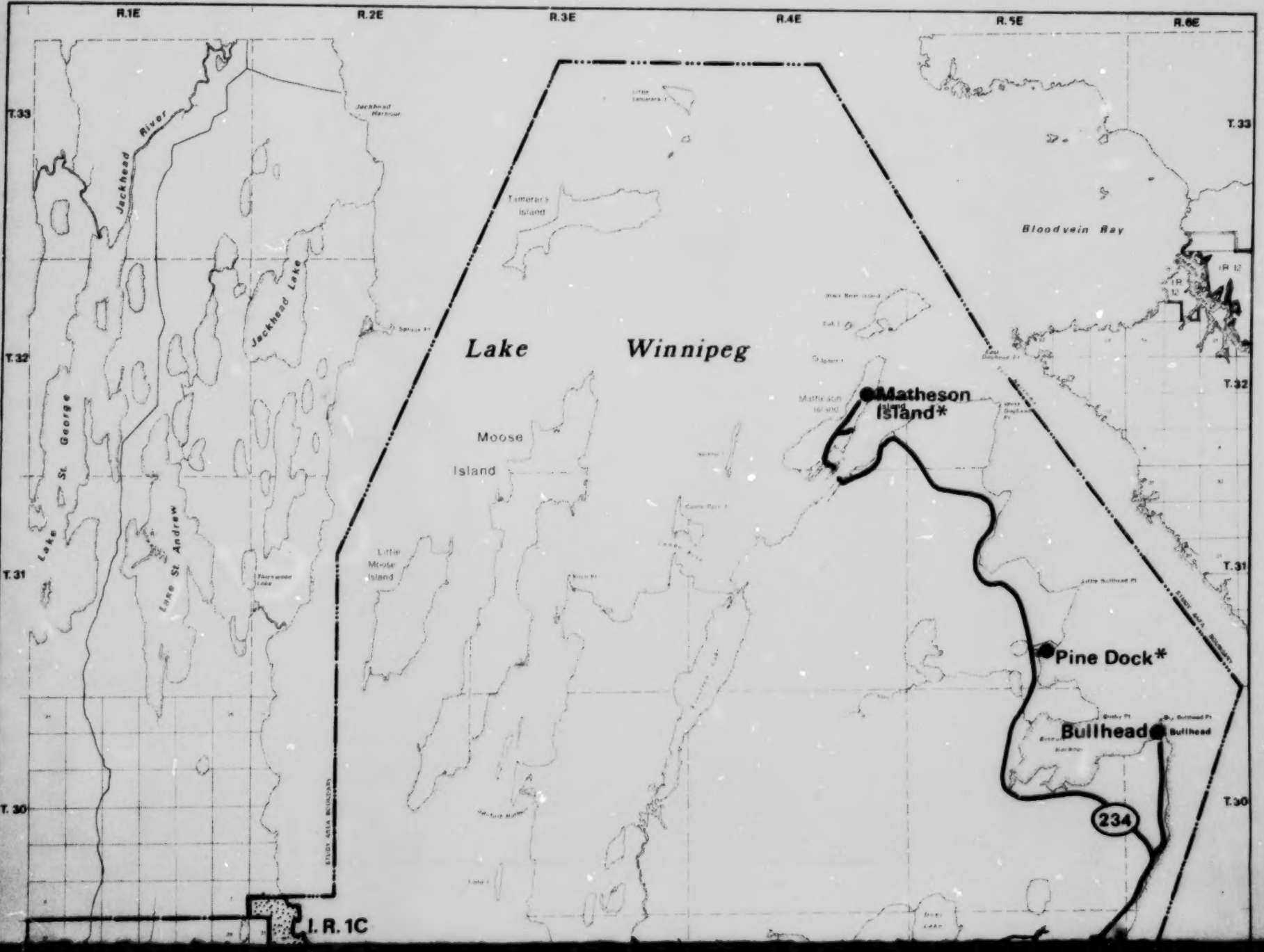
The mean maximum summer temperatures are above 21 degrees celcius while the mean minimum temperatures are above 10 degrees celsius. The mean maximum winter temperatures are below freezing and the mean minimum winter temperatures are below minus 18 degrees celsius (Smith et al. 1975).

The transition from winter to summer is abrupt generally occuring in April while the change from summer to winter normally occurs in October. One of the main characteristics of the climate is a variation in both seasonal and daily temperatures. This is especially true in fall and spring when the region is affected by a series of low pressure centers passing along the Polar front between cold and warm air masses.

The average length of the frost free period above zero degrees celsius ranges from 105 to 120 days (Dunlop and Shaykwich 1982).

Approximately 70 percent of the total precipitation received, falls as rain during the period from April to October and about 30 percent occurs as snow during the period from November to March (Smith et al. 1975). The average annual total precipitation is approximately 457.2 mm (Weir 1983).

The average precipitation for the period of May 1 to September 30 is 325mm (Dunlop and Shaykwich 1982). The amount of precipitation which falls during the above growing season plays an important role in the vegetative growth of the area.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T.33
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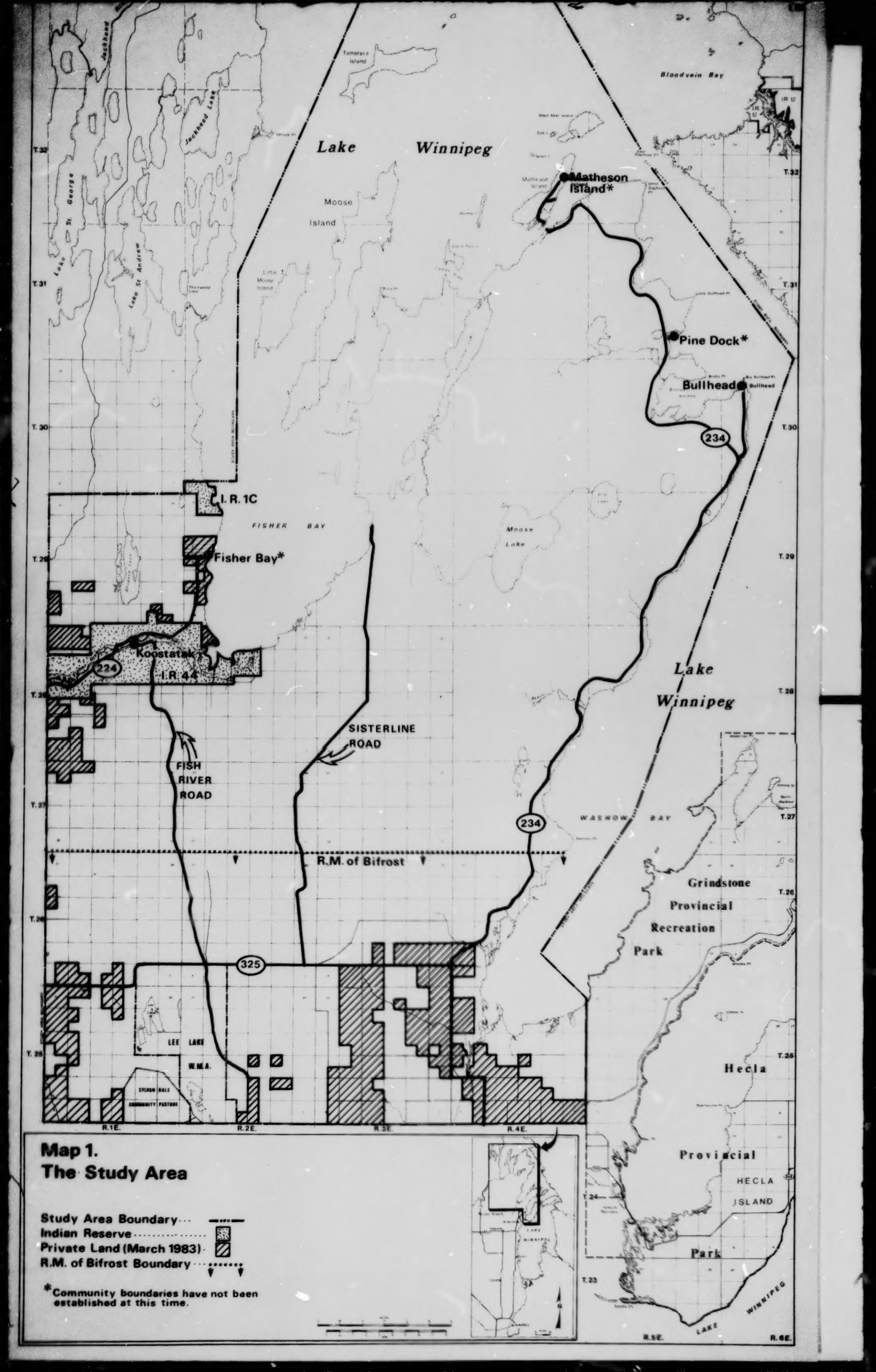
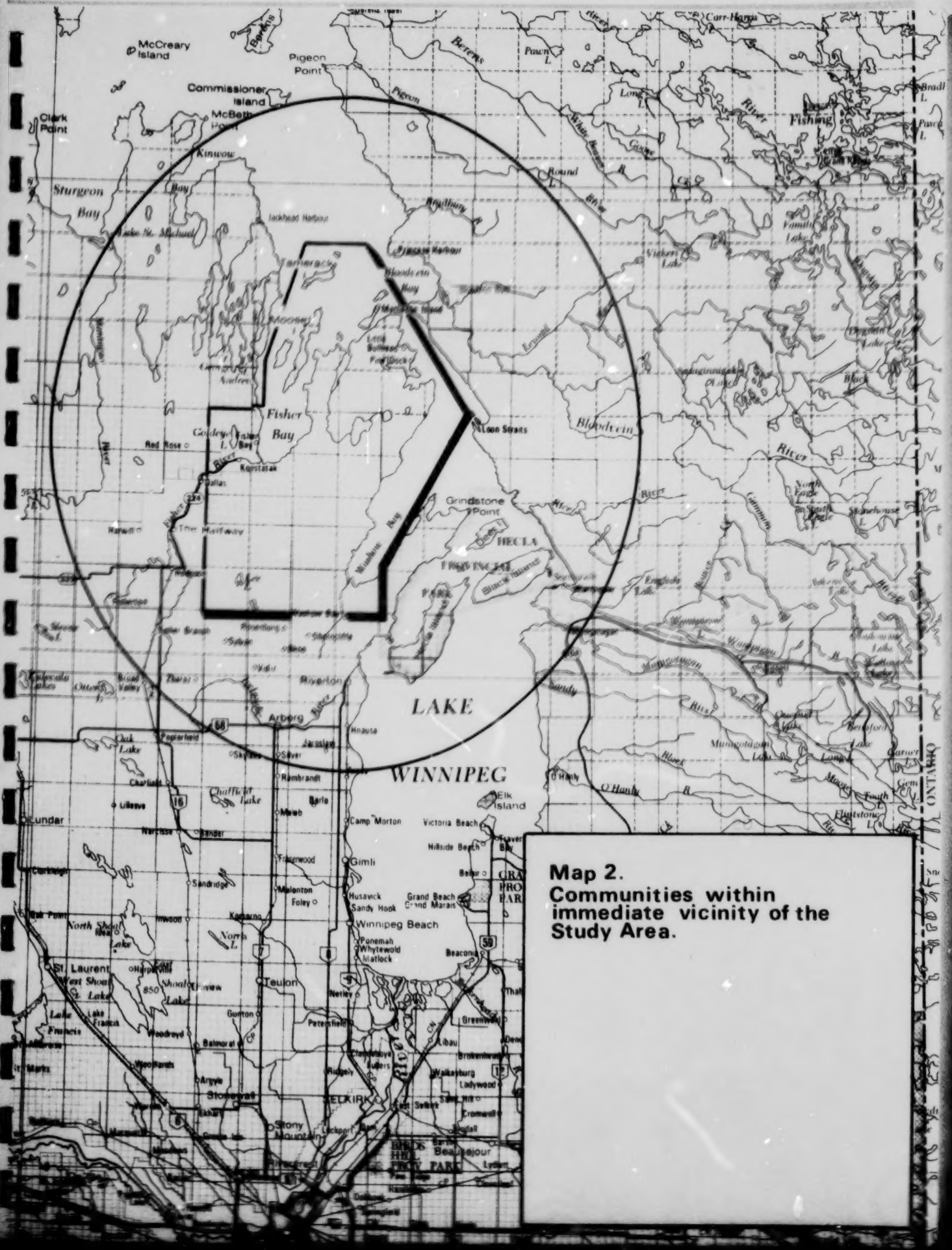
T.31
T.30
Jackhead River
Jackhead Harbour
Jackhead Lake
Lake St George
Lake St Andrew
Tamarack Island
Lake Winnipeg
Moose Island
Little Moose Island
Bloodvein Bay
IR 12
Matheson Island*
Pine Dock*
Bullhead
234
I. R. 1C

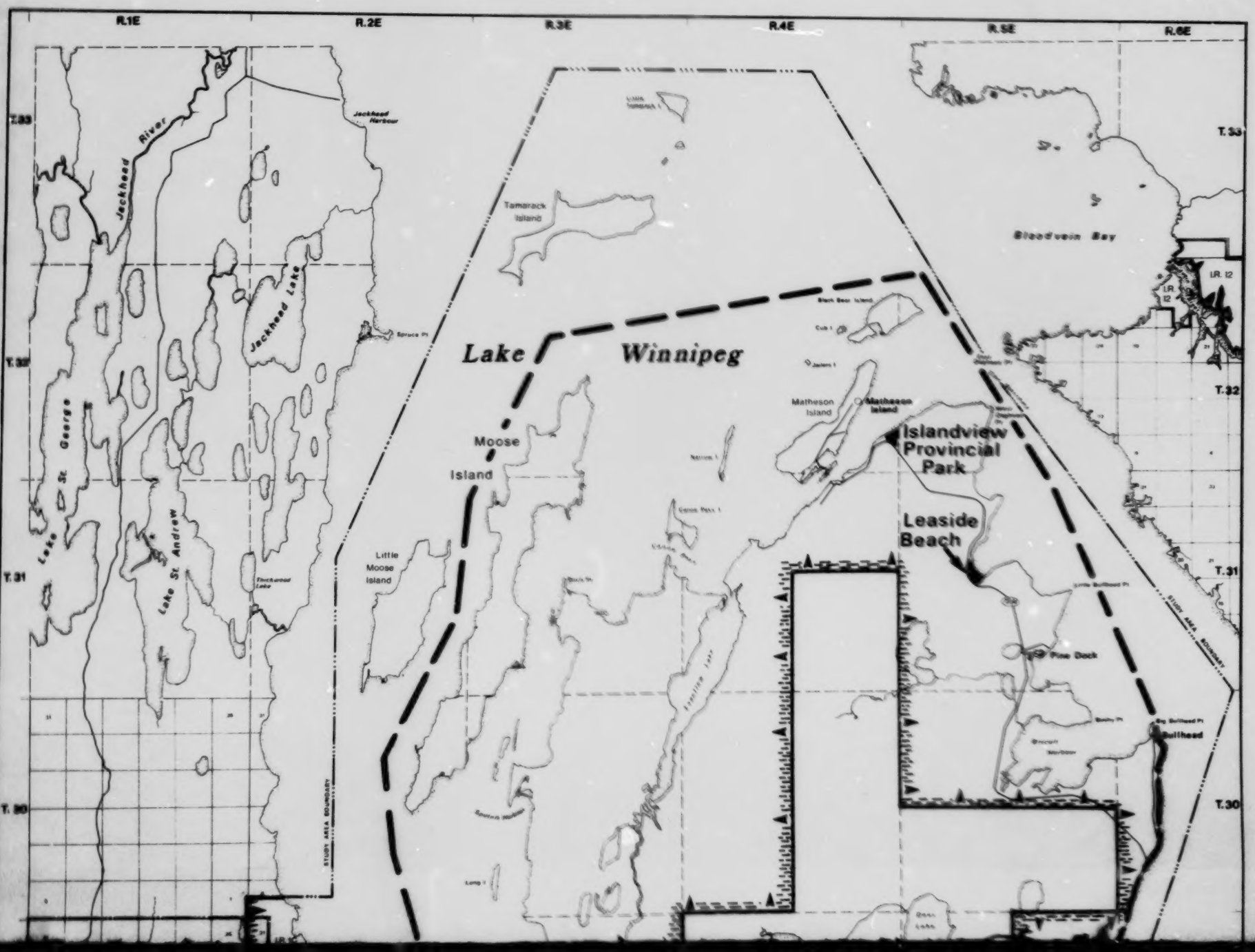



**Map 1.**
**The Study Area**

Study Area Boundary
Indian Reserve
Private Land (March 1983)
R.M. of Bifrost Boundary

*Community boundaries have not been established at this time.


McCreary Island
Pigeon Point
Commissioner Island
McBeth Point
Clark Point
Kinwow
Sturgeon Bay
Lake St. Martin
Jackhead Harbour
Fisher Bay
Red Rose
Dallas
The Narrows
Grindstone Point
HECLA PROVINCIAL PARK
Black Island
LAKE WINNIPEG
Riverton
Arborg
Hnausa
Gimli
Camp Morton
Victoria Beach
Elk Island
Hillside Beach
Grand Beach
Grand Marais
Husavick
Sandy Hook
Winnipeg Beach
Ponemah
Whytewold
Matlock
Beaconia
Netley
Petersfield
Libau
Teulon
Stonewall
Stony Mountain
Lockport
Selkirk
Beausejour
Lundar
Narcisse
Inwood
Kenaston
Sandridge
Malonton
Foley
Fraserwood
Rambrandt
Silver
Jarvis
Oak Lake
Poplarfield
Chatfield
Moreb
Berlo
Charlton
Ontario
Ontario
Map 2.
Communities within immediate vicinity of the Study Area.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R.2E
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R.5E
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T.33
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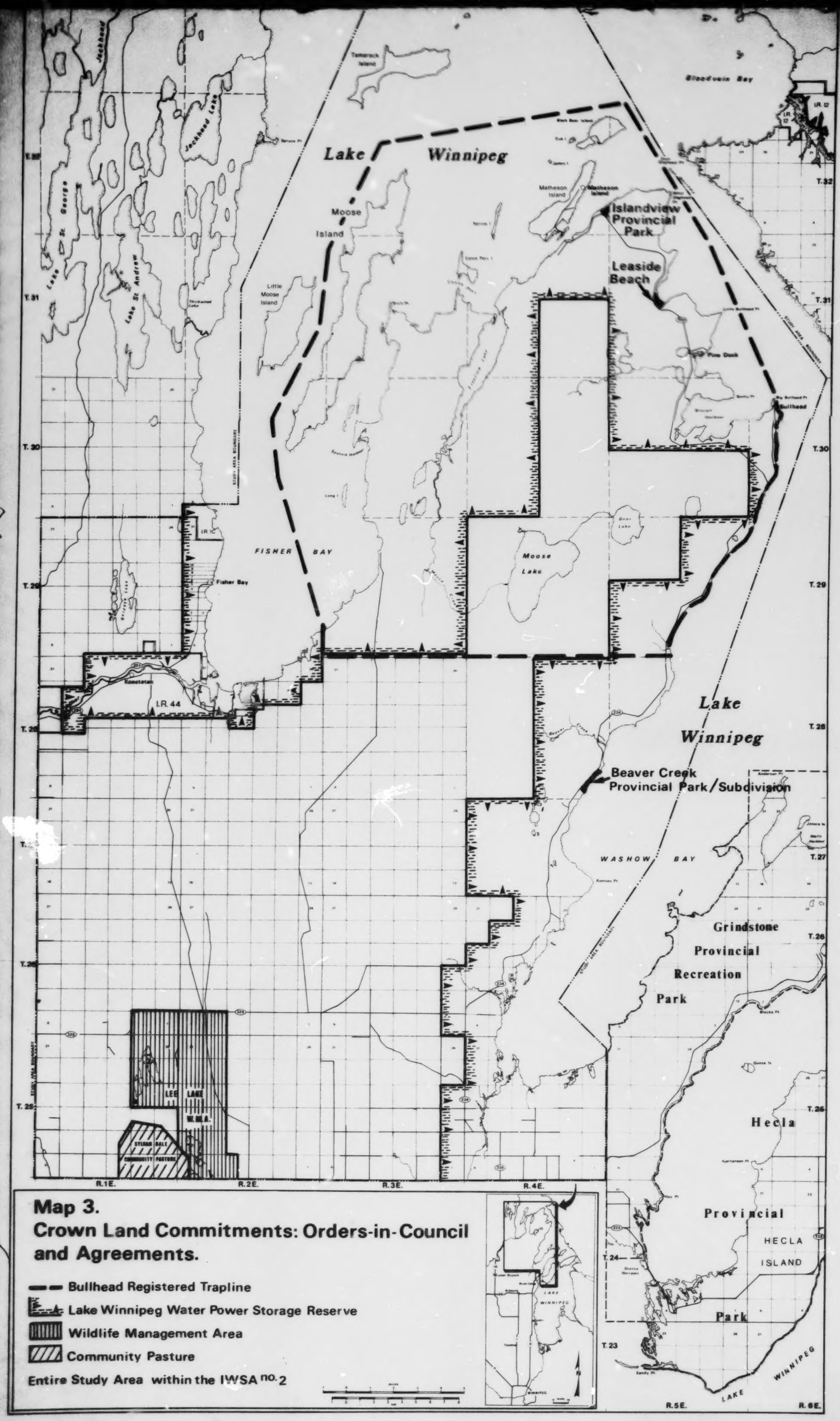
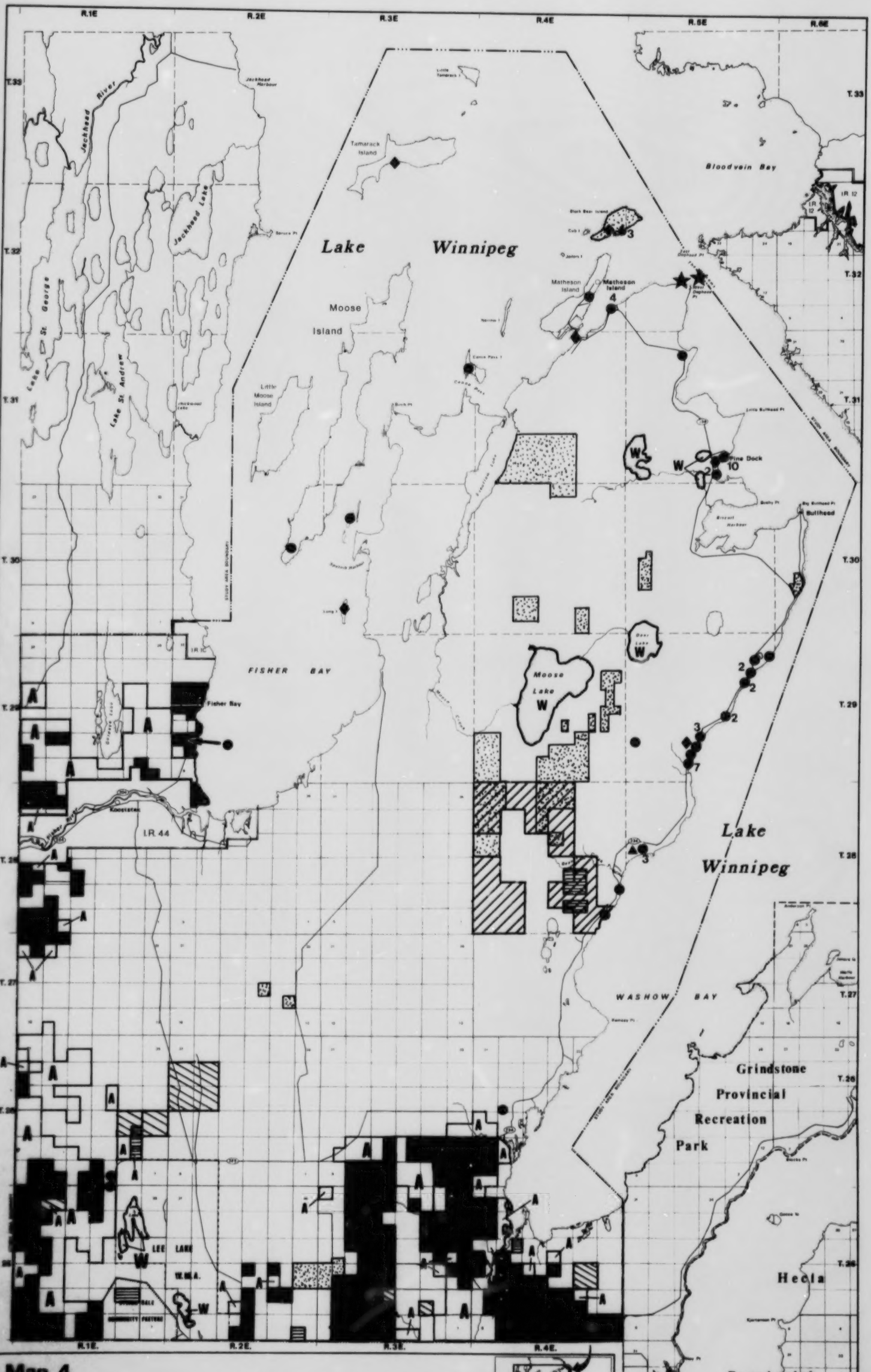
T.31
T.30
Jackhead River
Jackhead Harbour
Jackhead Lake
Lake St George
Lake St Andrew
Thicketwood Lake
Spruce Pt
Tamarack Island
Lake Winnipeg
Moose Island
Little Moose Island
Black Bear Island
Cub I
Jackson I
Matheson Island
Matheson Island
Islandview Provincial Park
Leaside Beach
Natives I
Canoe Pass I
Canoe Pass
Crooked Lake
Long I
Bloodvein Bay
IR. 12
IR. 12
Pine Dock
Big Bullhead Pt
Bullhead
Bullhead Harbour
STUDY AREA BOUNDARY
STUDY AREA BOUNDARY



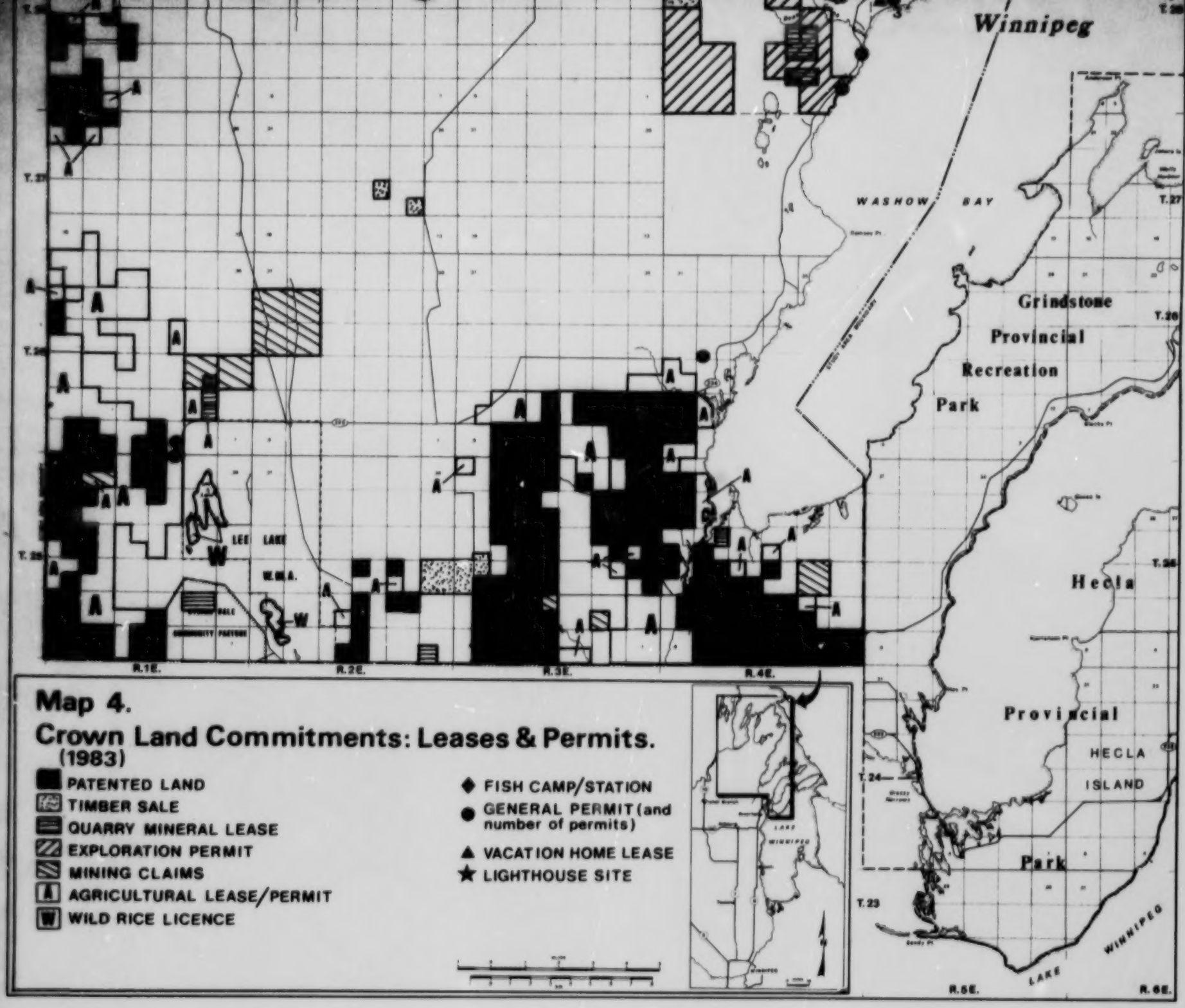

**Map 3.**
**Crown Land Commitments: Orders-in-Council and Agreements.**

- Bullhead Registered Trapline
- Lake Winnipeg Water Power Storage Reserve
- Wildlife Management Area
- Community Pasture

Entire Study Area within the IWSA no. 2




**Map 4.**
**Crown Land Commitments: Leases & Permits.**
**(1983)**




## Map 4.

## Crown Land Commitments: Leases & Permits. (1983)

- PATENTED LAND
- TIMBER SALE
- QUARRY MINERAL LEASE
- EXPLORATION PERMIT
- MINING CLAIMS
- AGRICULTURAL LEASE/PERMIT
- WILD RICE LICENCE
- FISH CAMP/STATION
- GENERAL PERMIT (and number of permits)
- VACATION HOME LEASE
- LIGHTHOUSE SITE

## Physiographic Description

There are generally no prominent relief features in the study area. The highest elevation occurs in the southwest (elevation 244 meters, 801 feet) with a general decrease in elevation in a north and east direction to Lake Winnipeg (elevation ± 214 meters, 712 feet). Except for the western portion which is drumlinized and has a low ridge and swale topography, the majority of the study area is generally level to very gently sloping.

The Fisher River, Moose Creek, Sugar Creek, and Beaver Creek together with their contributory ditches provide some drainage for the area (Maps 5 and 6). The majority of these streams flow north to northeast through shallow channels, swamps and peatland into Lake Winnipeg. Local flooding may often occur during spring thaw and after heavy rains.

The region is underlain by dolomitic limestone and dolomite of the Red River formation. The limestones and dolostones contribute to the calcareous materials that make up the surface deposits in a large portion of the area.

Smith et al. (1975:3) indicate that a surface mantle of unconsolidated rock materials covers the bedrock formations throughout most of the area. These unconsolidated materials are composed of rock fragments derived from bedrock formations through the action of continental ice sheets which completely covered Manitoba in recent geological times. The ice sheets picked up and transported huge quantities of materials from the bedrock formations over which they passed. When the ice sheets melted these rock materials were deposited as glacial drift in various forms. These drift deposits constitute the parent materials from which the soil have been developed.

The area has been divided into three physiographic subunits of the Lake Winnipeg Lowland Division. Smith et al. (1975:3-9) describe these units accordingly, Map 7.

The Fisher River Plain (2a) is a level, to gently undulating area consisting of shallow lacustrine deposits over till. The lacustrine deposits found along the Fisher River are strongly calcareous, medium textured sediments, and are usually greater than 76 cm (30 inches) thick. More recent alluvial deposits, found near the river, are also medium textured and strongly calcareous. A large portion of this unit is occupied by prominent narrow north to south oriented drumlins. The surface deposits consist dominantly of thick, loam to clay textured, ground moraine on the ridges and thin, fine to moderately fine textured lacustrine deposits overlying strongly calcareous glacial till in the swales. The drainage is rapid on the drumlins and imperfect to poor in intervening swales. In the eastern portion of the plain surface deposits are extremely stony and calcareous, and a few limestone outcrops and beach deposits are also found.

The Icelandic River Plain (2c) includes Moose, Little Moose, Tamarack, Matheson, and Black Bear Islands. The area is depressional to very gently sloping and consists dominantly of deep acidic organic deposits underlain by deep lacustrine clay. The upland areas consist of extremely calcareous, water-worked moraine deposits. Some limestone outcrops are found in the Biscuit Bay area. The surface deposits consist mainly of siliceous sandy materials originating from quartzose sandstone of the Winnipeg formation.

In addition to these two subunits a small portion of the area has been designated Sturgeon Bay Lowlands (2b). The principal surface deposits being glacial deposits of thick loamy and clayey drumlinized ground moraine, thin clay veneer and organic deposits alongside lacustrine deposits of medium to moderately fine textures.

## Vegetation

The study area lies within the southern part of the Boreal Forest Region in the Manitoba Lowland Section (Rowe 1959 and Smith et al. 1975:11-14).

The characteristic species of the Boreal Forest Region are white and black spruce (Map 8). White spruce occurs on fresh to moist sites, mainly on mineral soil and very frequently mixed with other tree species, mostly aspen, balsam fir, black spruce and white birch. The most common species in the understory are hazel, mountain maple, snowberry, and horsetail.

Black spruce is found on wet, poorly drained sites, predominantly on organic soils but can also be found on drier sites. On slightly better drained sites, black spruce is associated with the feather mosses, Labrador tea, bog-rosemary, bog laurel, dwarf birch, willow. Alder is found in the shrub layer.

Another common site type occurs in the drainage channels, where tamarack and alder are mixed with black spruce.

As a result of repeated fires and logging, the southern part of the study area consists chiefly of hardwood species, dominantly aspen, on the fresh and moist sites. The recent Riverton forest fire (1977) burned approximately 53,000 hectares in this area, (Map 9). These aspen communities represent an intermediate stage of the vegetation succession, which occurs after fires or logging. Associated with the aspen are balsam poplar, white spruce, white birch and balsam fir. In the understory dogwood and hazel are the most common species.

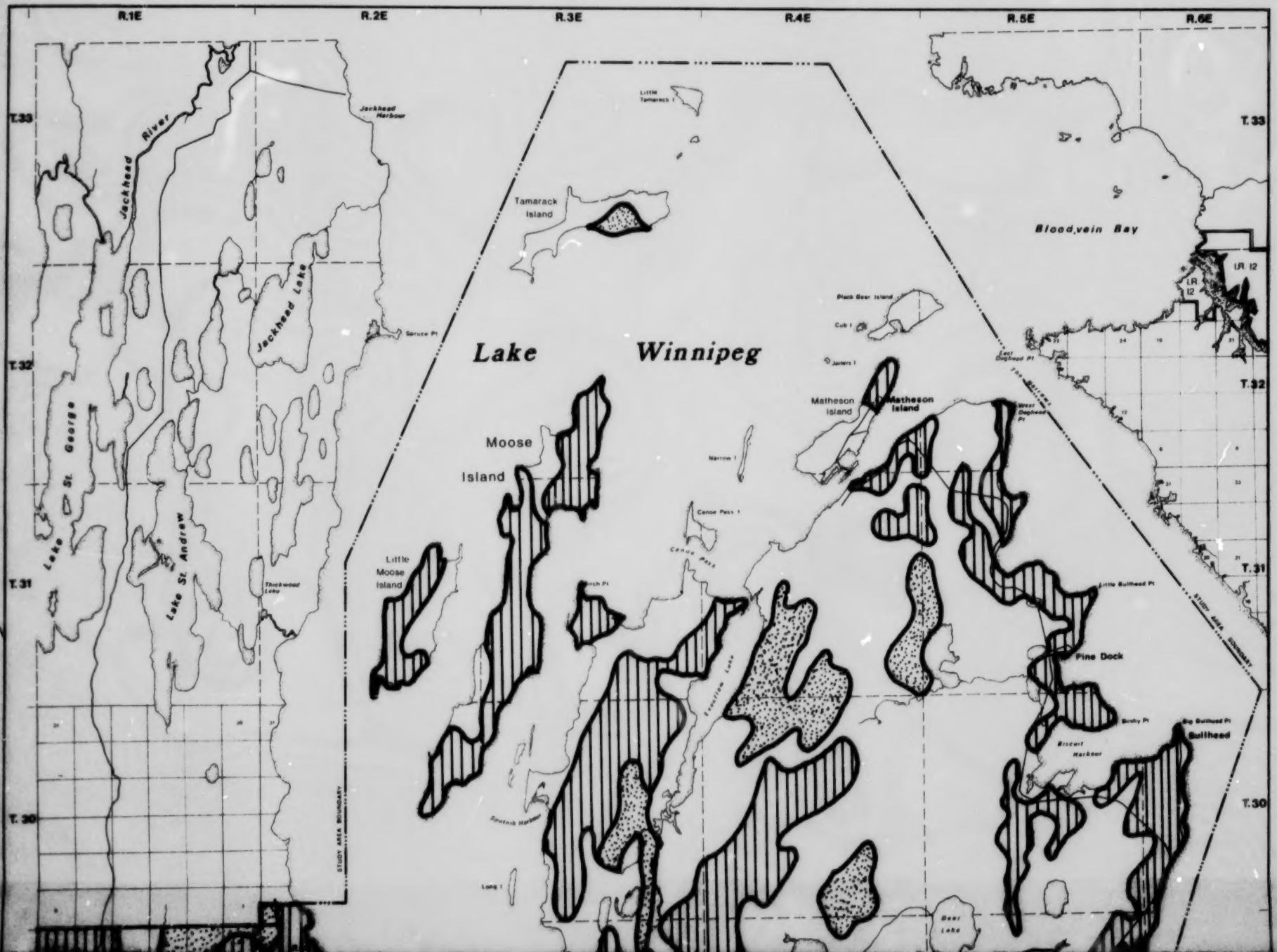
The dry areas, generally on low ridges, are forested by pure stands of jack pine or jack pine mixed with white birch. Burr oak occurs on similar dry sites in the southern portion of the study area. In the understory creeping juniper, bearberry, Rose spp., hazel and snowberry are the dominant species. Pure stands of jack pine may be established on dry to fresh sandy or loamy soils after fires.

A secondary vegetative group of importance that offers management opportunity is the characteristic species of native grasses, sedges and reeds found within the Washow-Fisher Peninsula. The native grass species found on the better drained upland sites are bluegrasses (Poa sp.), ryegrasses (Elymus sp.) and fescues (Festuca sp.). The low lying areas support reed grasses (Calamagrostis sp.) and sedges (Carex sp.).

On the better drained sites along the rivers and drainage channels elm, green ash, Manitoba maple and balsam poplar are commonly found.

The vegetation of bog peatlands is highly specialized. The most common species are stunted black spruce with an understory of Sphagnum mosses and ericaceous shrubs.

The fen peatlands have richer and more varied vegetation, composed largely of species not present in bogs. The characteristic species are sedges, reed grasses, bullrushes, cattails, willow and swamp birch.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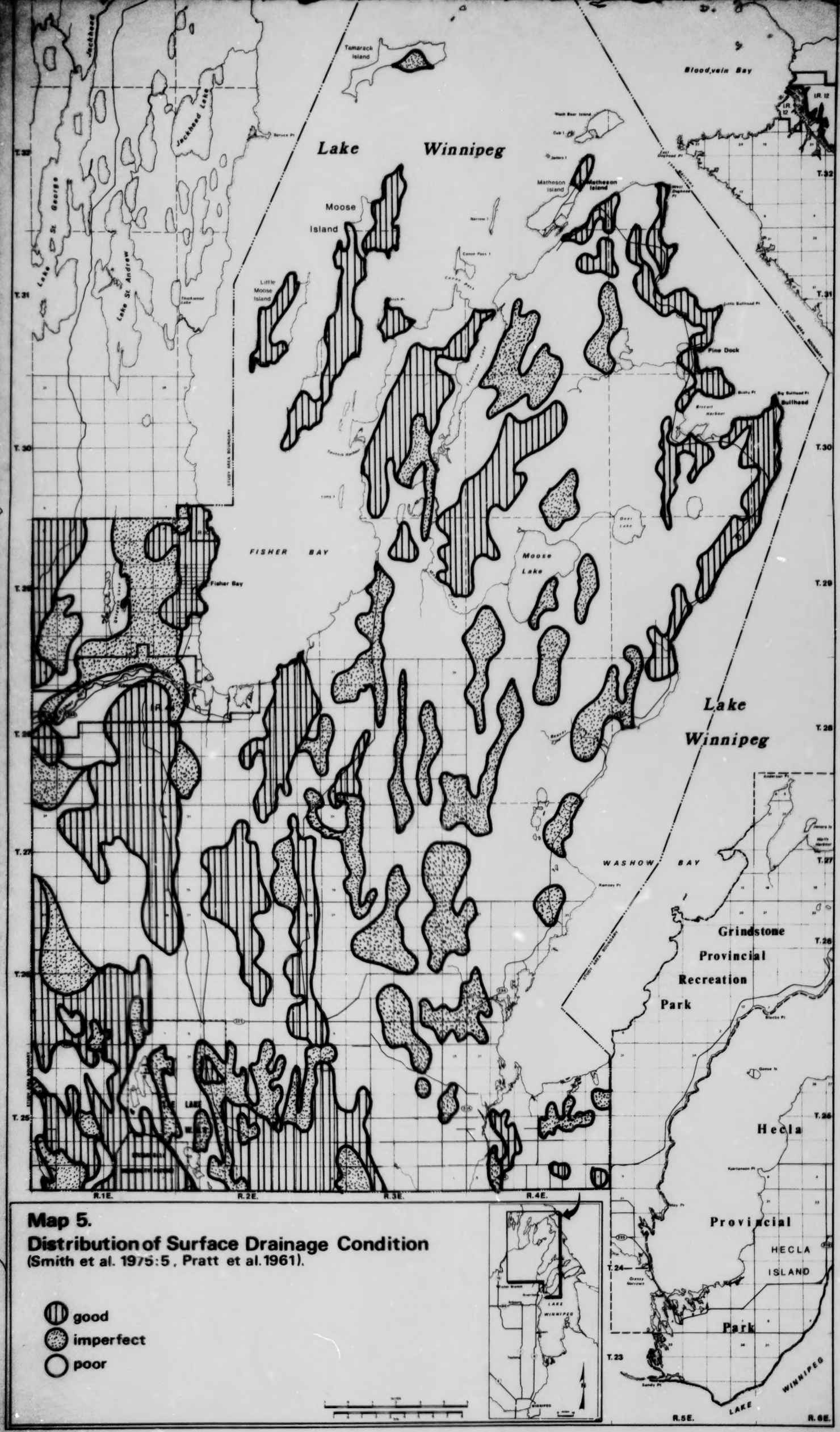
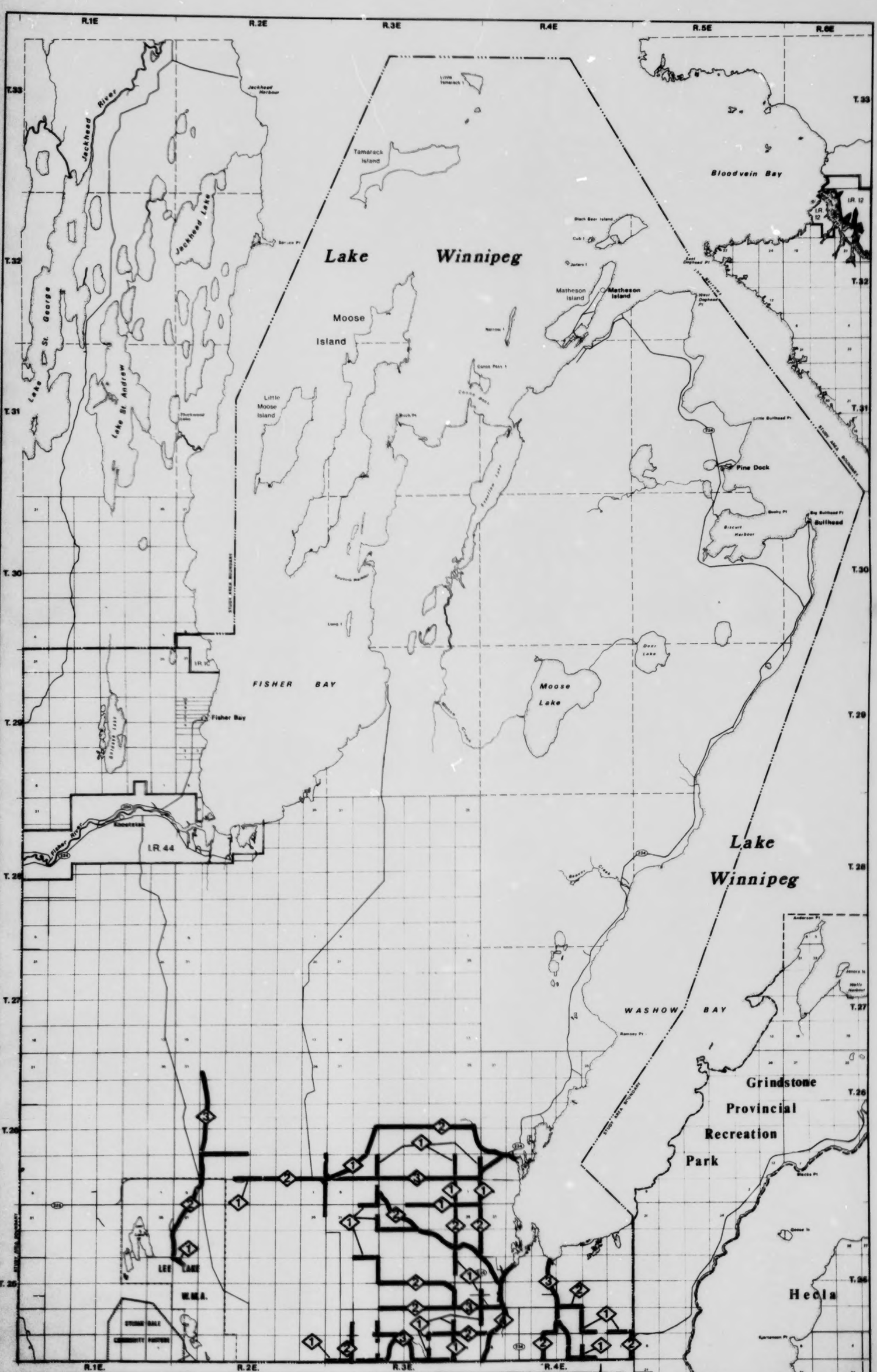
Little Tamarack I
Moose Island
Little Moose Island
Matheson Island
Matheson Island
Bloodvein Bay
IR 12
IR 12
Pine Dock
Bullhead
Jackhead River
Jackhead Harbour
Jackhead Lake
Spruce Pt
Lake St George
Lake St Andrew
Thickwood Lake
Black Bear Island
Cub I
Juniors I
East Dogshead Pt
West Dogshead Pt
Narrow I
Canoe Pass I
Canoe Pass
Birch Pt
Little Bullhead Pt
Big Bullhead Pt
Bushy Pt
Biscuit Harbour
Southern Harbour
Long I
Bear Lake
STUDY AREA BOUNDARY




**Map 5.**

**Distribution of Surface Drainage Condition**
(Smith et al. 1975:5, Pratt et al. 1961).

- good
- imperfect
- poor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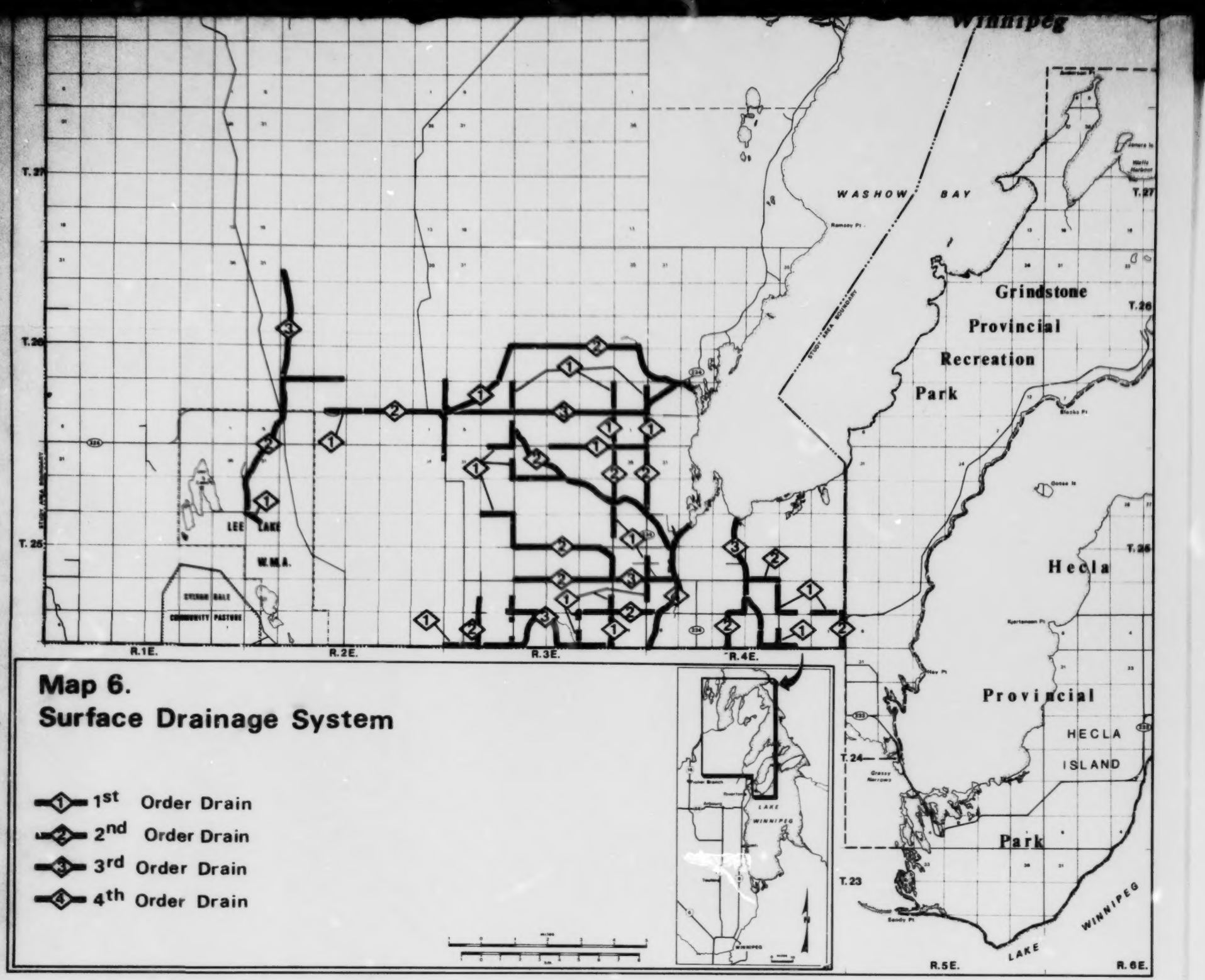
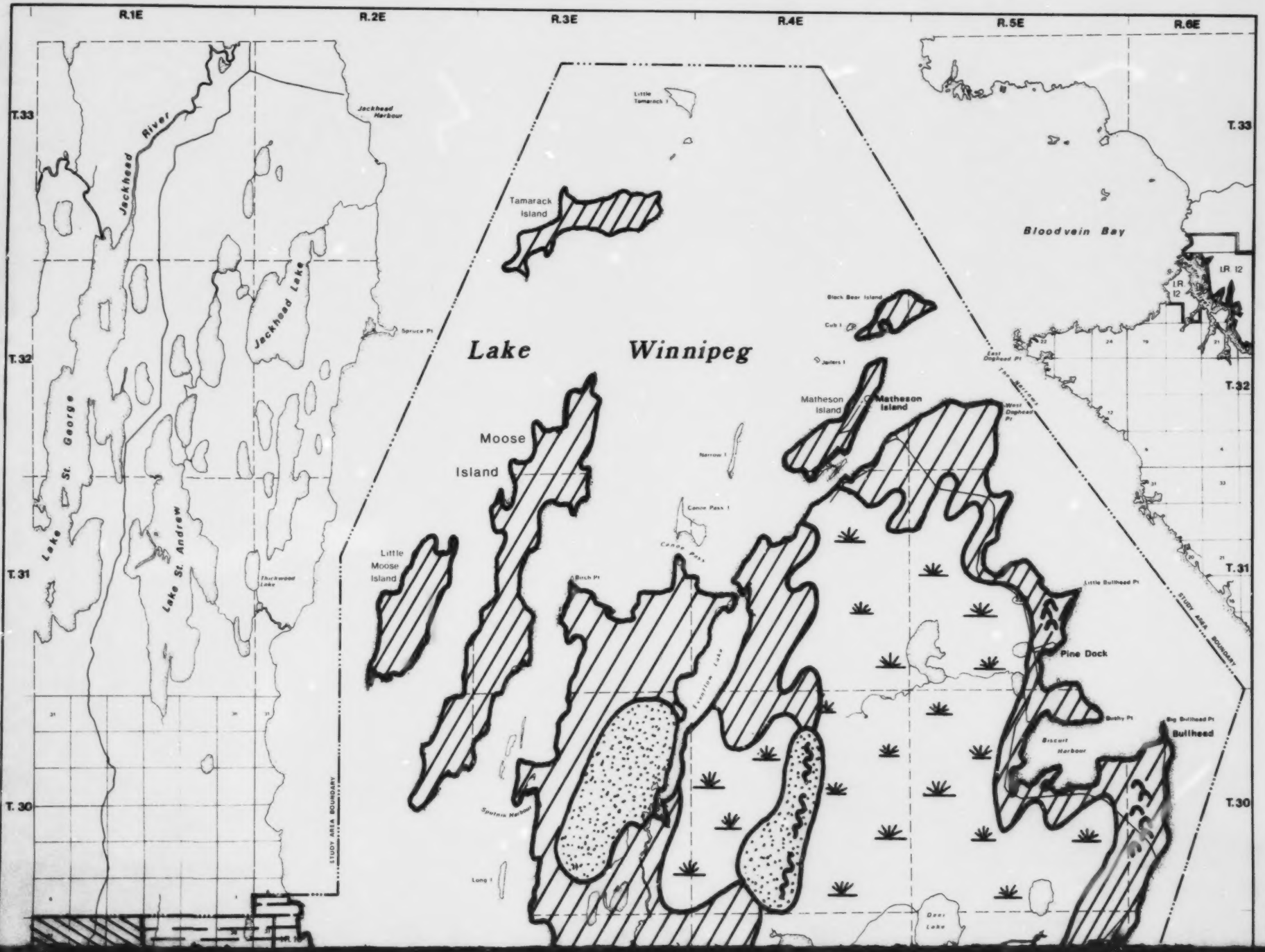
Jackhead Harbour
Jackhead Lake
Lake St. George
Lake St. Andrew
Tamarack Island
Lake Winnipeg
Moose Island
Little Moose Island
Matheson Island
Bloodvein Bay
IR 12
Pine Dock
Bullhead
Biscuit Harbour
FISHER BAY
Fisher Bay
IR 44
IR 1C
Moose Lake
Deer Lake
WASHOW BAY
Grindstone Provincial Recreation Park
Hecla
LEE LAKE W.M.A.
STONE HILL COMMUNITY PASTURE
STONY MOUNTAIN




# Map 6.
# Surface Drainage System

- 1st Order Drain
- 2nd Order Drain
- 3rd Order Drain
- 4th Order Drain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Jackhead Lake
Spruce Pt
Lake St. George
Lake St. Andrew
Thurkwood Lake
STUDY AREA BOUNDARY
Lake Winnipeg
Little Tamarack I
Tamarack Island
Black Bear Island
Cub I
Jaffers I
Matheson Island
Moose Island
Narrow I
Canoe Pass I
Canoe Pass
Little Moose Island
Birch Pt
Sputnik Harbour
Long I
Bloodvein Bay
LR 12
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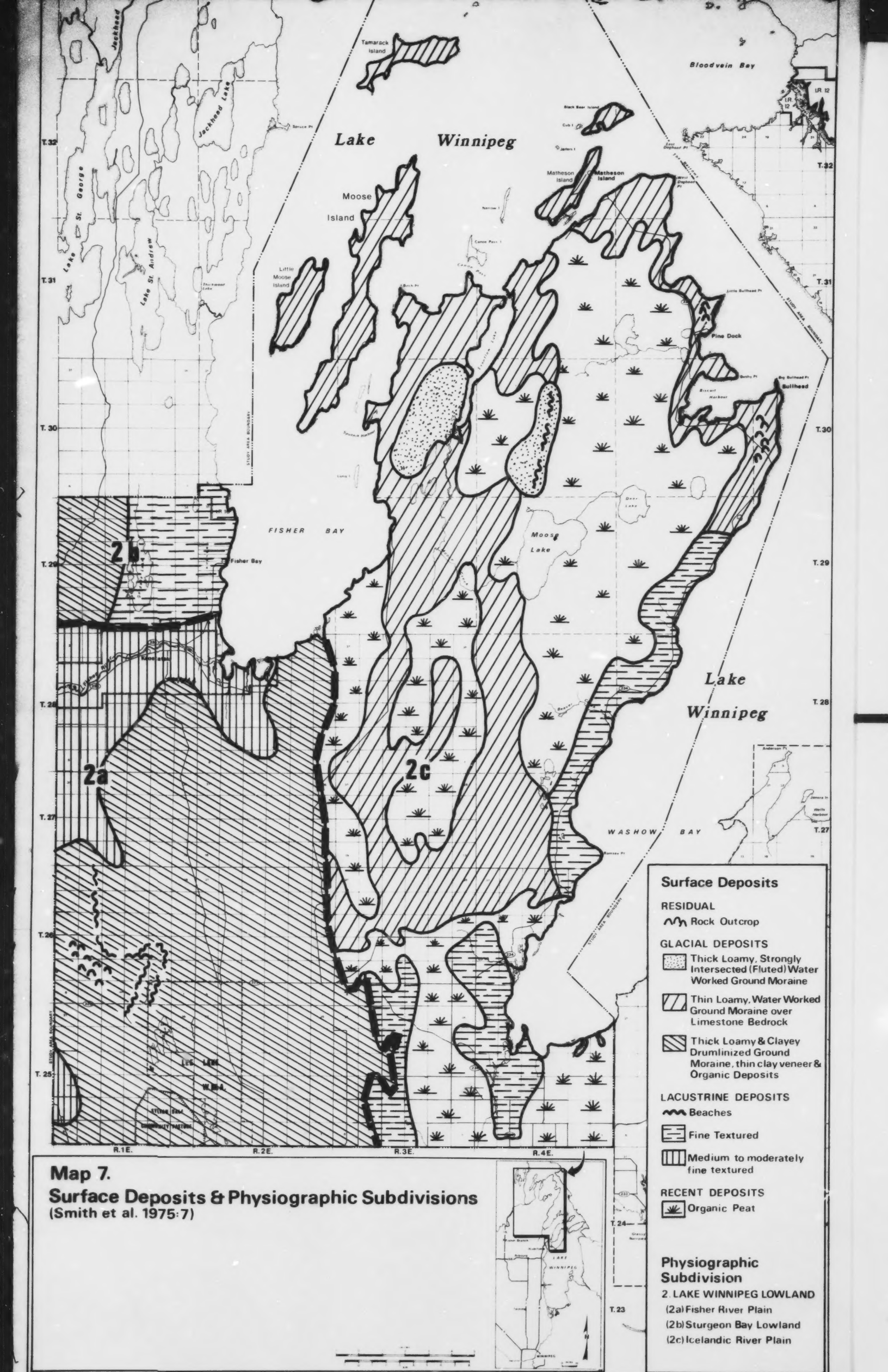
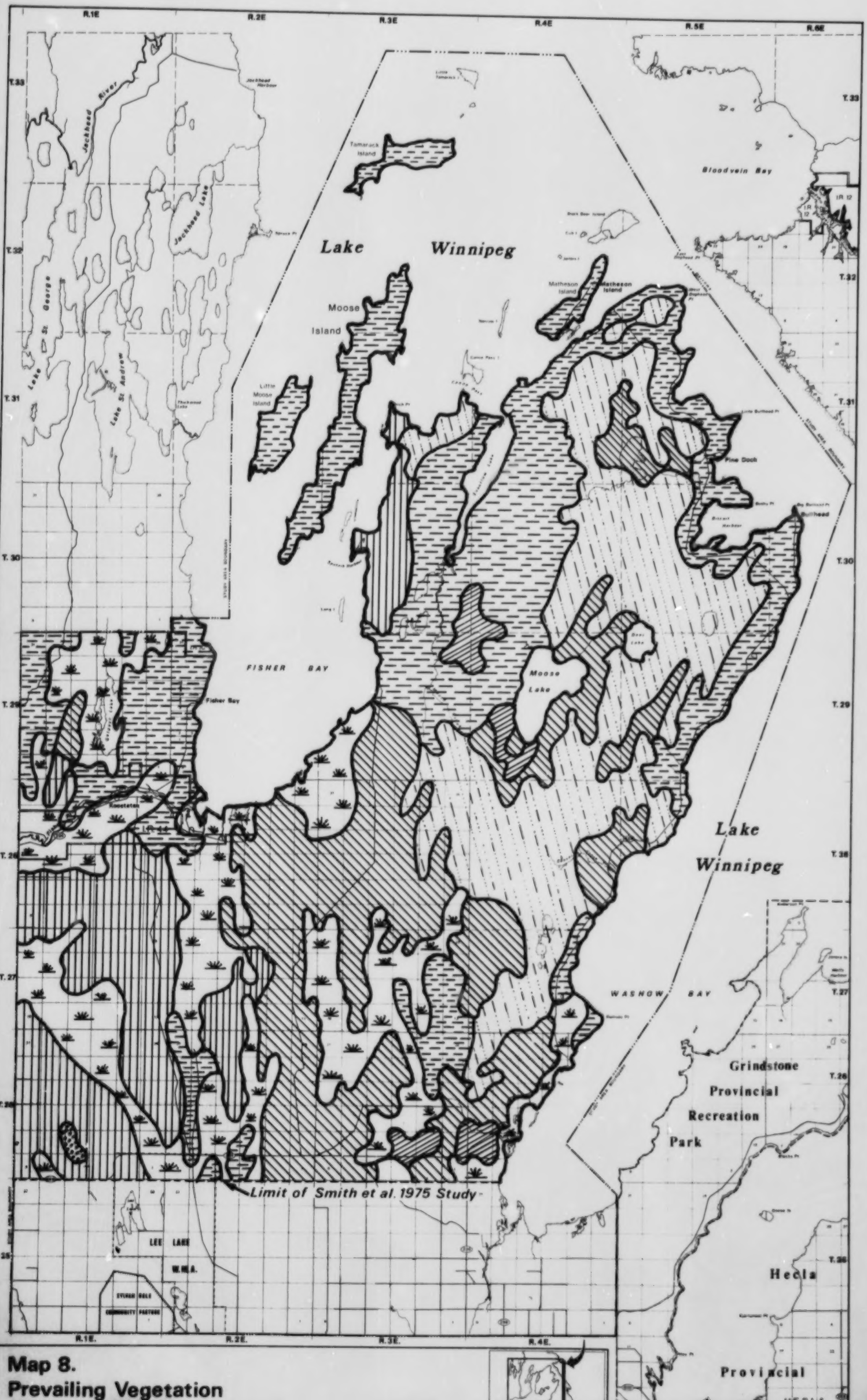
West Dogh ead Pt
Little Bullhead Pt
Pine Dock
Bushy Pt
Big Bullhead Pt
Bullhead
Biscuit Harbour
Deer Lake

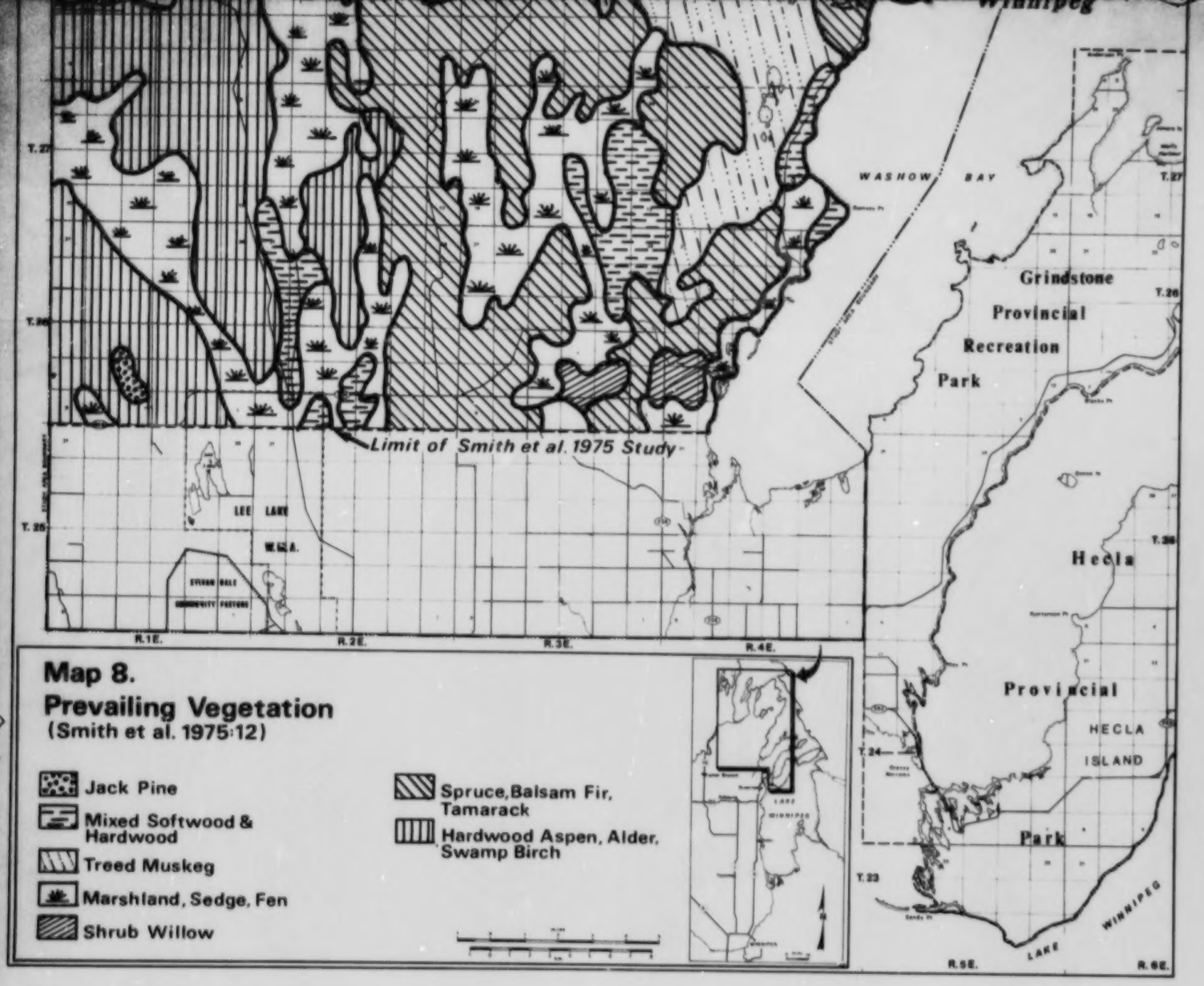



**Map 7.**

**Surface Deposits & Physiographic Subdivisions**
**(Smith et al. 1975:7)**

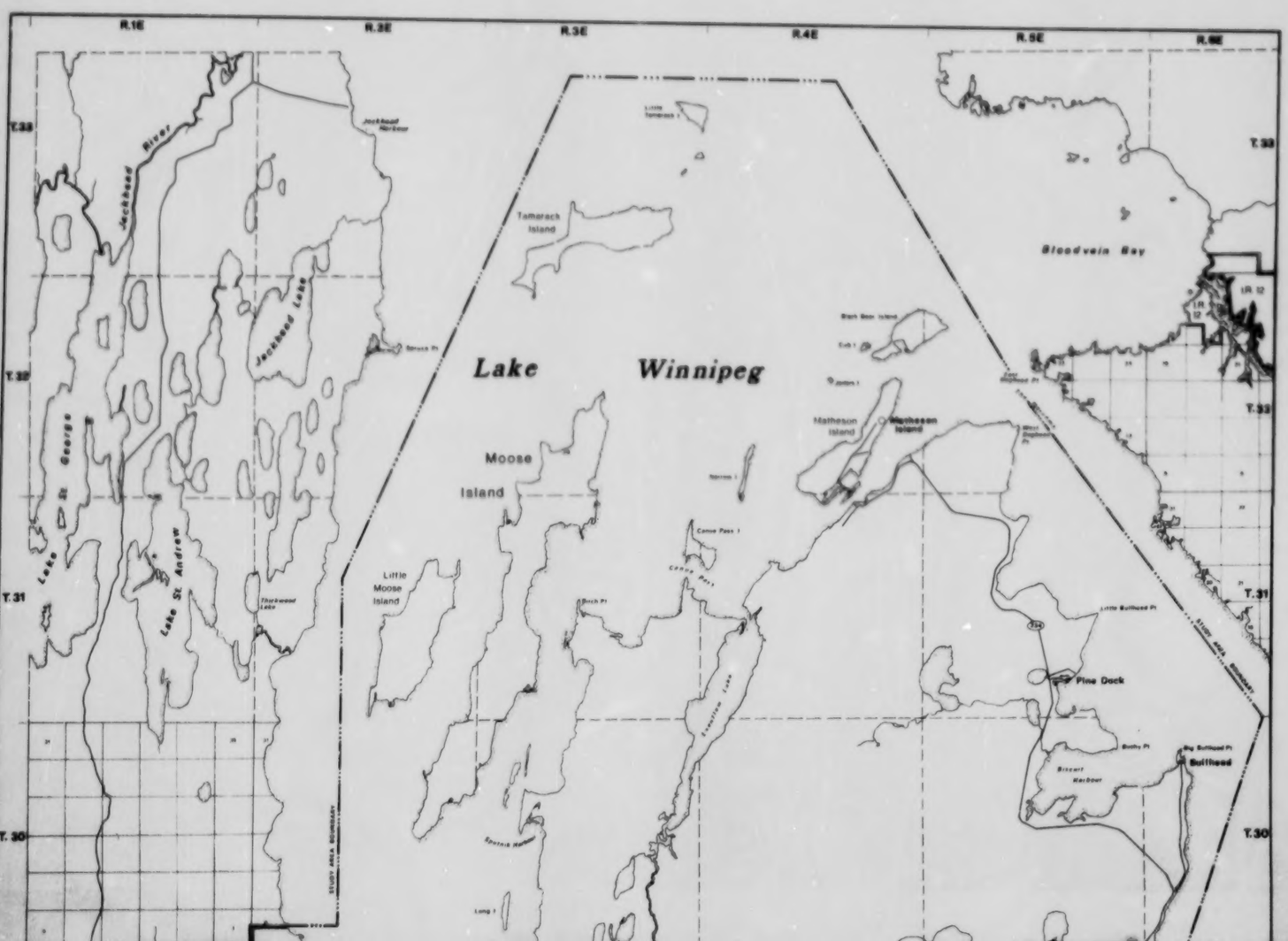


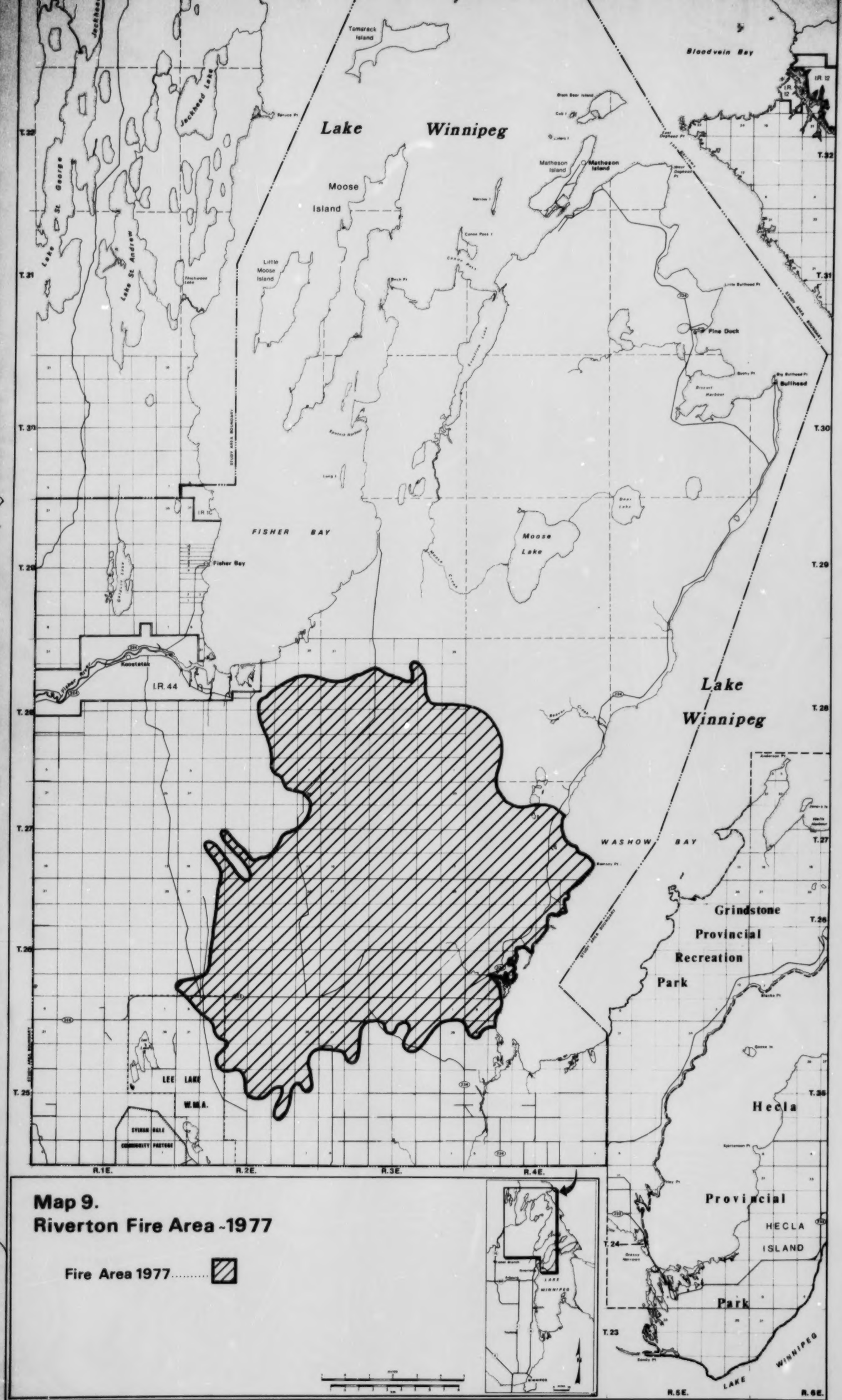

**Map 8.**
**Prevailing Vegetation**




**Map 8.**
**Prevailing Vegetation**
(Smith et al. 1975:12)

- Jack Pine
- Mixed Softwood & Hardwood
- Treed Muskeg
- Marshland, Sedge, Fen
- Shrub Willow
- Spruce, Balsam Fir, Tamarack
- Hardwood Aspen, Alder, Swamp Birch






**Map 9.**
**Riverton Fire Area -1977**

Fire Area 1977.....

## Soils

Climate, drainage, vegetation, parent material, and relief act upon the unconsolidated parent materials to form the soil profile. The type of soil formed in any one place is dependent upon the interaction of these factors and upon the length of time they have been active.

The soils[1] of the area (Smith et al. 1975:18) have developed in the southern fringe of the boreal forest under subhumid continental climatic conditions. Organic matter is added to the soil in the form of forest litter and herbaceous plant materials. Coniferous trees and herbaceous species are still abundant and thus the forest litter is rich in these latter plant materials that are readily decomposed. Consequently, the A horizons of most of the soils are high in organic matter and thus dark in color. The A horizon is slightly leached because of climatic conditions and forest vegetation. Under these conditions Orthic Dark Grey soils have developed. The drainage condition of the map area is generally poor and thus the dominant mineral soil type is Gleyed Dark Grey.

Under the same climatic conditions soils show differences due to both texture and mineralogical composition of the parent material. Brunisolic soils have developed on calcareous glacial till; the result of the extremely calcareous nature of the parent material and cool climate. The clay, iron and aluminum in these soils are eratically translocated with the result that the Ae horizons are often weakly developed, broken or absent. These soils appear to represent a stage of soil development between Regosolic and Luvisolic soils.

Gleysolic soils have developed in poorly drained areas on a variety of parent materials with textures ranging from clay to sand. Saturated conditions are reflected in soils by dull grey colors and/or iron mottling. These soils usually have a well developed mesic peat organic surface horizon.

Regosolic soils are confined to the narrow flood plain along the Fisher River.

Organic soils have developed on poorly or very poorly drained areas. The cool subhumid climate provides conditions suitable for the development of peat deposits. Because these soils are of vegetal origin, they reflect the succession of vegetation deposited, and provide a record of the changing ecology in peatlands. These soils are developed from three kinds of peat minerals: 1) forest peat, 2) fen peat and 3) sphagnum peat.

[1] No soils map is presented in this report. For a detailed map see the Smith et al. 1975 soils report on the area

# SECTION 2. AGRICULTURE

## Introduction

The agriculture industry serves as a major source of economic activity in most rural communities as well as for Canada as a nation. The agriculture industry has major direct contributions to all levels of the economy as a producer of food, as an employer, and as a significant part of the processing and service sectors (McCuaig and Manning 1982). The total Manitoba value of farm production in 1982 was $2,015,000,000 (Manitoba Department of Agriculture 1982).

Canada is, and has the potential to remain relatively self-sufficient in many foodstuffs. Current prairie surplus agricultural production enables other Canadians to enjoy abundant high quality food at exceedingly low relative cost (Bently 1981). The Canadian export market principally in grains accounted for seven percent of the total Canadian export earnings in 1978 and 21 percent in 1961 (McCuaig and Manning 1982). From 1961 to 1976 Canadian imports of agricultural produce grew from 854 million to 2,872 million dollars. It would appear that although agriculture exports account for great economic earnings for this country, Canada is becoming increasingly dependent upon foreign food sources. The economic gains from export, Canada's competitiveness relative to foreign markets, problems of a less secure food supply, and the dependence on foreign food sources, are all dependent upon the availability of land for agricultural uses. This will become increasingly evident as populations continue to increase. Thus, the maintenance of the existing agricultural lands as well as ensuring the availability of land with potential for future agricultural utilization is important to all levels of the economy.

The land base is the principle resource of any agricultural activity. The land base in Canada and Manitoba is not unlimited. Only 0.05 percent of the total Canadian land base consists of prime agricultural lands (Class 1, 2, 3 - Canadian Land Inventory (CLI)) for agriculture (McCuaig and Manning 1982). Manitoba has only 5.4 million hectares (13.3 million acres) of prime land.

Not only is the land base that is suitable for agriculture use limited but the total Canadian land utilized for farmland has shown a net decrease of 1.4 million hectares from 1961 to 1976. East of the Manitoba-Ontario border there was a net loss of more than 3.9 million hectares of farmland during this period. Some of this loss was offset by a net increase west of the Manitoba-Ontario border from 1961-1976 of 2.5 million hectares. These losses in farmland can be attributed to urban expansion and land utilization by other non-agricultural uses.

There has then been a westward shift of the Canadian agricultural base. Agricultural expansion has occurred mainly in the northern prairies with major decreases in net farmland occurring in the East (McCuaig and Manning 1982). If this trend continues, complimented with increases in population and demand for food, there will be greater pressures for expansion of agricultural activities onto lands not presently utilized for agricultural purposes. Northern Manitoba represents one of the five important areas in Canada having untapped potential for arable uses (Smith 1980). Portions of the Washow-Fisher Peninsula fall into this category of untapped agricultural potential.

## Agriculture Use and Demand

Private land at the southern end of the study area and along the western edge is used primarily for mixed farming occurring on both mineral and organic soil. The Crown lands under agricultural leases are used primarily for cereal crop production on the "outer" fringe area, gradually giving way to forage (livestock) leases which are closer to private land holdings (Map 10).

With little or no expansion potential in southern Manitoba, coupled with high land prices and the need to expand to form economic farm units, the potential agricultural land in the study area is under increasing pressure for use as more and more southern farmers are relocating in and around the study area and as local farmers expand their operations. This pressure has increased within the last 2-3 years not only due to this normal farm expansion, but as a result of the displacement of local farmers who were farming within the Peguis Indian Reserve by band farmers who have taken over more of the reserve land. Consequently these displaced farmers are requesting additional agricultural land (Table 1).

From 1967 to 1975 leased and permitted agricultural Crown land grew at a rate of about 1.75 percent per year. Translating this growth pattern into a need for additional land a projection based on a 1975 acreage total of 1,726,237 was made for Crown land under agricultural permit and lease.[1] The results of this projection indicate the need for an additional half million acres of Crown land in Agro-Manitoba for the projection period:

| YEAR | PROJECTED ACREAGE | ACTUAL ACREAGE UNDER DISPOSITION |
|---|---|---|
| 1975 | Base Projection Year | 1,762,237 |
| 1980 | 1,921,925 | 1,962,044[2] |
| 1985 | 2,096,083 | - |
| 1990 | 2,286,023 | - |

The study area makes up a portion of Agricultural Crown Land (administrative) District #50. This District had 129,061 acres under lease and permit in 1979 and this acreage increased to 151,058 by 1982. This expansion of an additional 22,000 acres exceeds the general growth rate for Agro-Manitoba.

At the present time there is little or no unencumbered Crown land in the more southerly developed agricultural area that could be used for agricultural expansion. What little there is, is hampered by some physical feature such as drainage. Expansion can only take place in a northerly direction due to the Peguis Indian Reserve on the west side of the study area, private land primarily to the south and Lake Winnipeg to the east.

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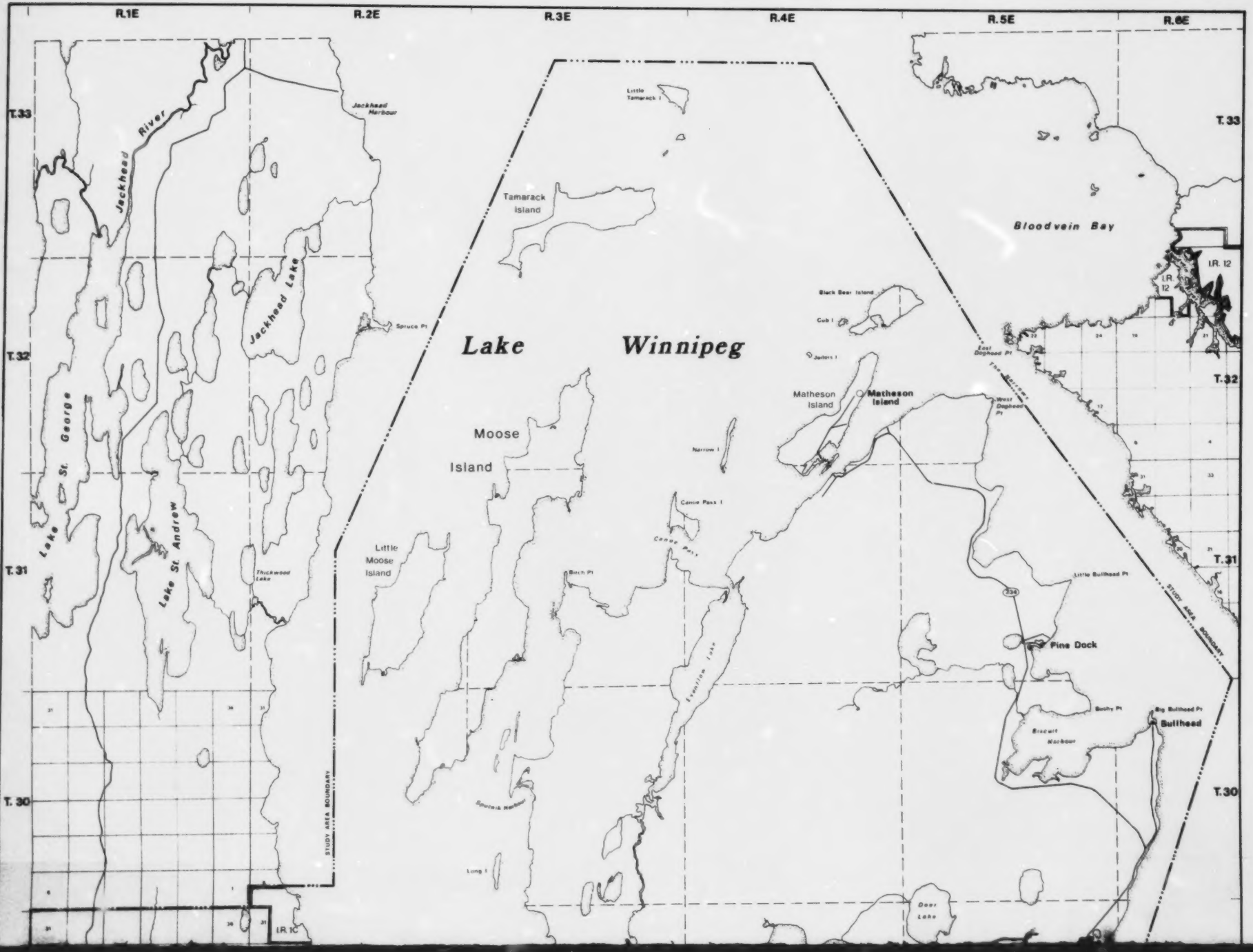
[1] W. Barto, Personal Communication

[2] Agricultural Crown Lands Statistical Report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STUDY AREA BOUNDARY
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Bushy Pt
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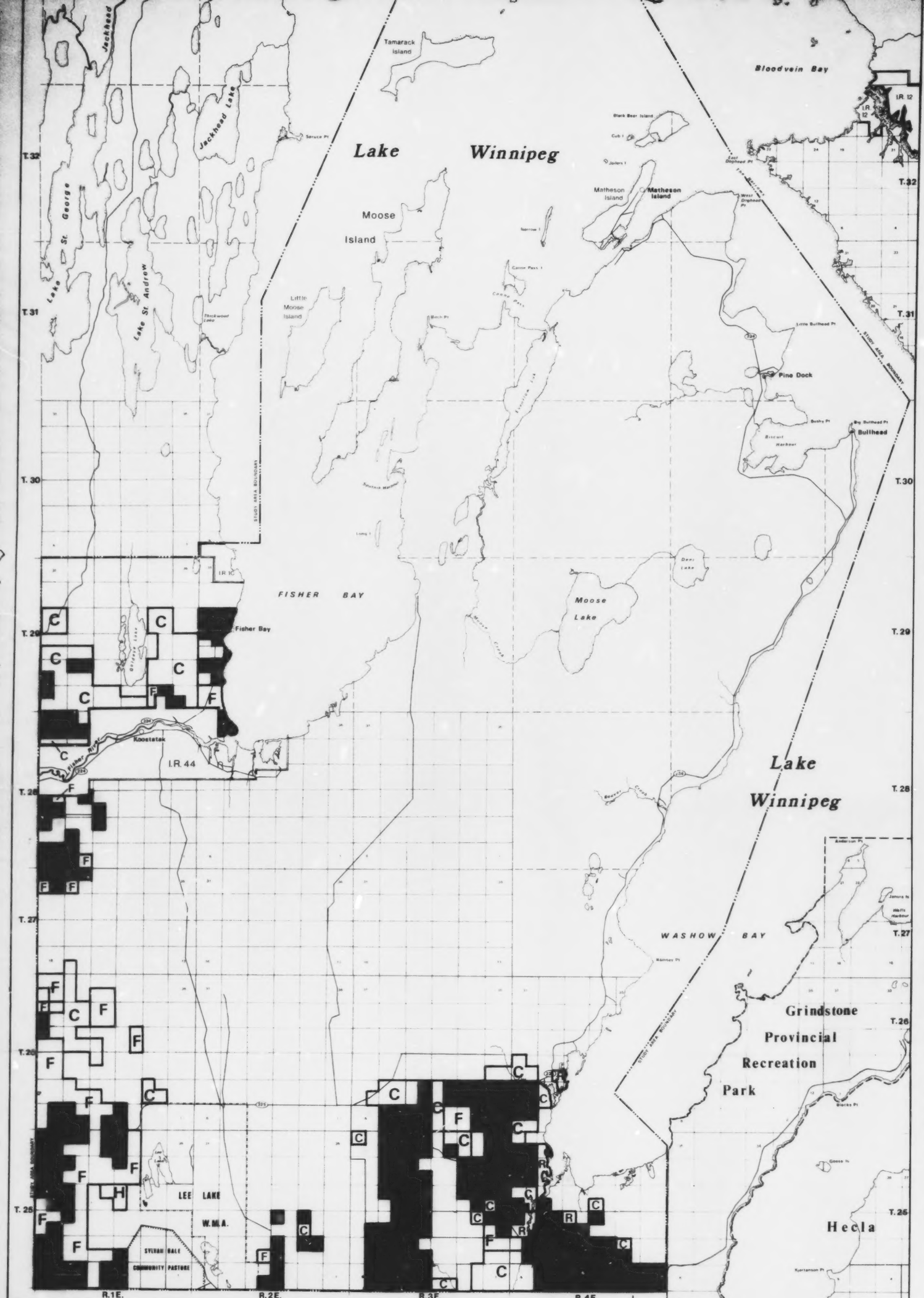
Bullhead
Biscuit Harbour
Deer Lake
STUDY AREA BOUNDARY




## Map 10.
## Agricultural Leases and Permits.

AGRICULTURAL COMMITMENTS (1983)

F - Forage Lease
C - Cash Rental Agricultural Lease
R - Renewable Hay Permit
H - Casual Hay Permit

PRIVATE LAND

Table 1. Crown Lands Advertised and Allocated for Agricultural Use, Townships 25-29 and Ranges 1-4E, 1977-1983[1]

| Advertising Year | Total Quarter Sections or Portions Thereof | Advertising Closing Date | Total Allocated |
|---|---|---|---|
| 1977/78 | 7 | Oct. 1977 | |
| | 2 | Dec. 1977 | |
| | 7 | Jan. 1978 | |
| | 12 | Feb. 1978 | |
| | | | 28 |
| 1978/79 | 4 | Sept. 1978 | |
| | | | 4 |
| 1979/80[2] | 2 | Dec. 1979 | |
| | 15 | Feb. 1980 | |
| | | | 17 |
| 1980/81 | 1 | Oct. 1980 | |
| | | | 1 |
| 1981/82 | 76 | Dec. 1981 | |
| | 20 | Mar. 1982 | |
| | | | 96 |
| 1982/83 | 1 | Oct. 1982 | |
| | 2 | Nov. 1982 | |
| | 6 | Dec. 1982 | |
| | 4 | Jan. 1983 | |
| | | | 22 |

1. L. Green, perscnal communication

2. During the period January 1979 to November 1981 a temporary land freeze was placed on the area. The only lands available for leasing were existing leases that were surrendered. No new land was advertised.

3. The majority of the parcels allocated were 160 acre parcels.

## Agricultural Capability[1]

There are approximately 89,000 hectares of mineral soils and 98,000 hectares of organic soils in the study area (Table 2). In the area described as having future agriculture potential (Crown land leases and private lands excluded) there are 59,000 hectares of mineral soils and 49,000 hectares of organic soils. The agricultural capability of these soils vary from Canada Land Inventory (CLI) Class 2 to Class 7 (Map 11). Therefore, there is a total land base of approximately 108,000 hectares (270,000 acres) with potential for agriculture expansion. (Table 3 and Map 12).

[1] See Appendix 2 for a detailed description of organic and mineral soil capability classification system.

Table 2. Canada Land Inventory Agricultural Capability Acreages for Study area[1]

| Class | Land Area (Approximate) Mineral Soils Hectares | (Acres) | Organic Soils Hectares | (Acres) |
|---|---|---|---|---|
| 2 | 18,000 | ( 45,000) | - | - |
| 3 | 15,000 | ( 38,000) | 25,000 | ( 61,000) |
| 4W, 6W, (3W) | 8,000 | ( 21,000) | - | - |
| 4 | 32,000 | ( 80,000) | 17,000 | ( 42,000) |
| 5 | 3,000 | ( 8,000) | negligible | |
| 6 | 10,000 | ( 24,000) | 49,000 | (120,000) |
| 7 | 3,000 | ( 8,000) | 7,000 | ( 18,000) |
| Total | 89,000 | (224,000) | 98,000 | (241,000) |

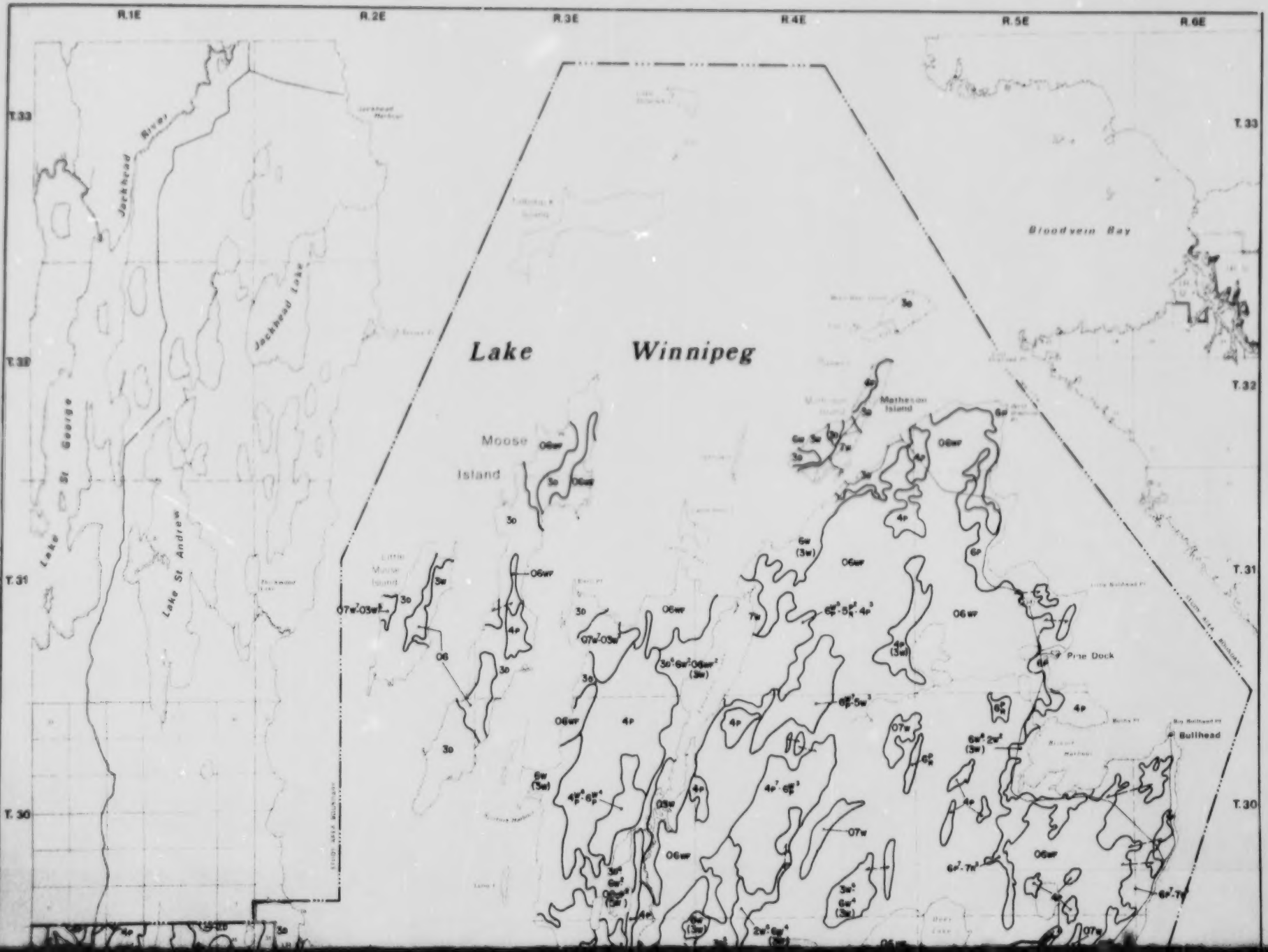
1. Figures do not include, lakes, Order-in-Council areas, Indian Reserves, Matheson Island, Seasonal Resort Subdivisions

Table 3. Land Area with Potential for Future Agricultural Expansion[1]

| Class | Land Area (Approximate)[2] Mineral Soils Hectares | (Acres) | Organic Soils Hectares | (Acres) |
|---|---|---|---|---|
| 2 | 11,000 | ( 28,000) | - | - |
| 3 | 9,000 | ( 23,000) | 21,000 | ( 53,000) |
| 4W, 6W, (3W) | 6,000 | ( 14,000) | - | - |
| 4 | 26,000 | ( 64,000) | 12,000 | ( 30,000) |
| 5 | 2,000 | ( 5,000) | - | - |
| 6 | 5,000 | ( 13,000) | 16,000 | ( 40,000) |
| Total | 59,000 | (147,000) | 49,000 | (123,000) |

1. Acreage within this table is limited to the area described and outlined on Map 12 as potential for future agricultural expansion

2. Area figures do not include lakes, Order-in-Council designations, Indian Reserves, Matheson Island, seasonal resort subdivisions, private land and Crown lands presently under hay permits, cropping and forage leases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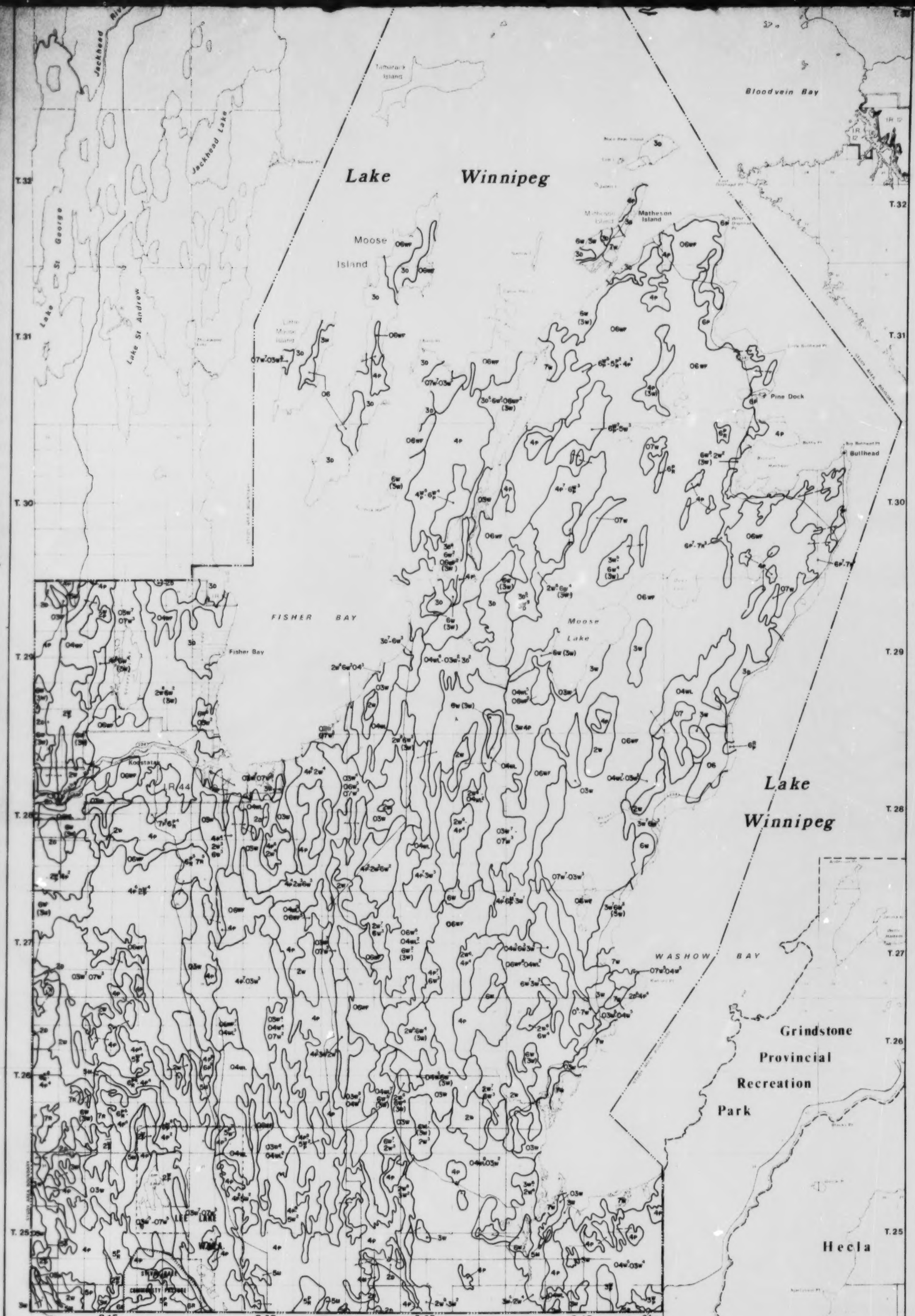
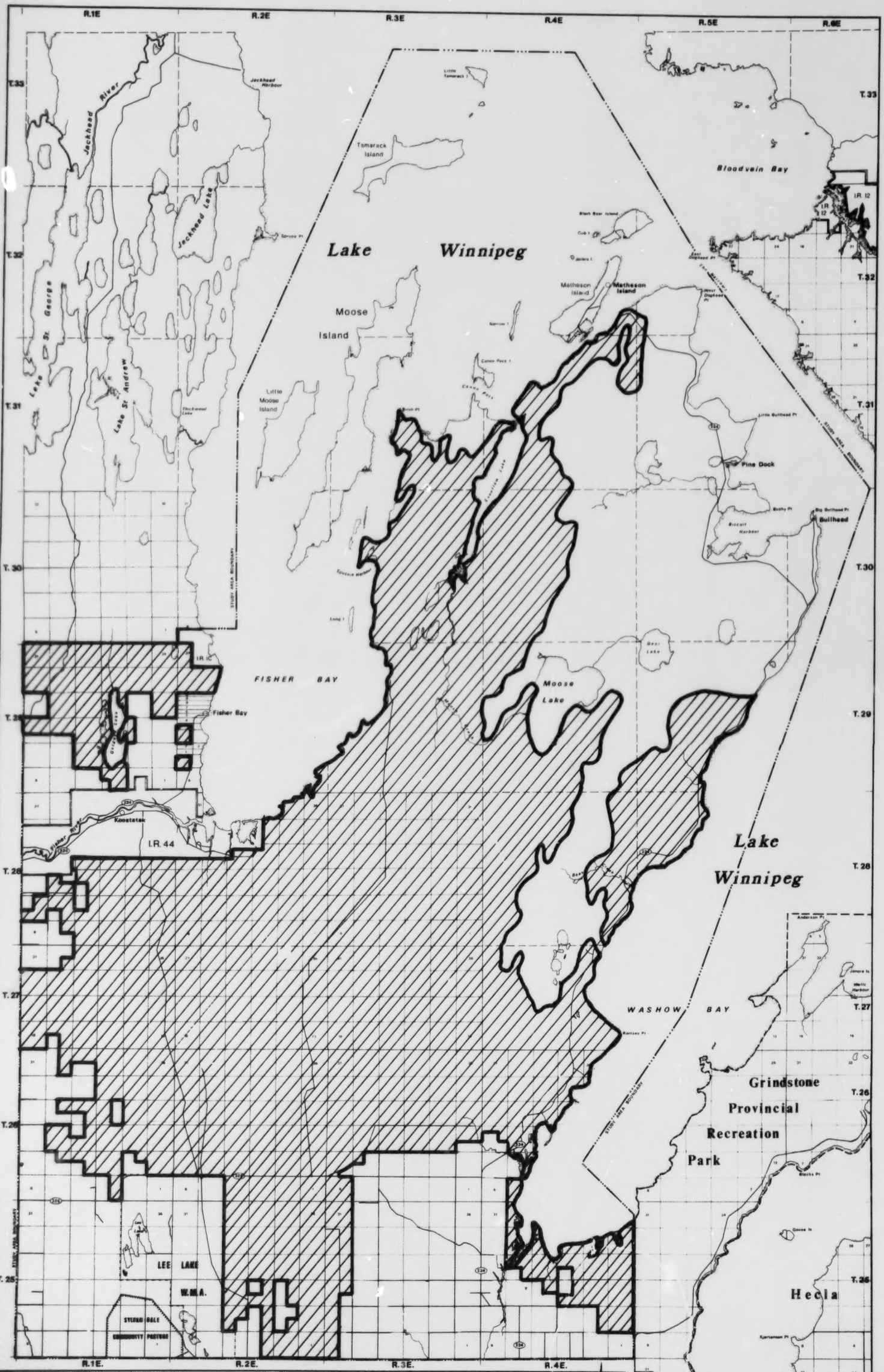


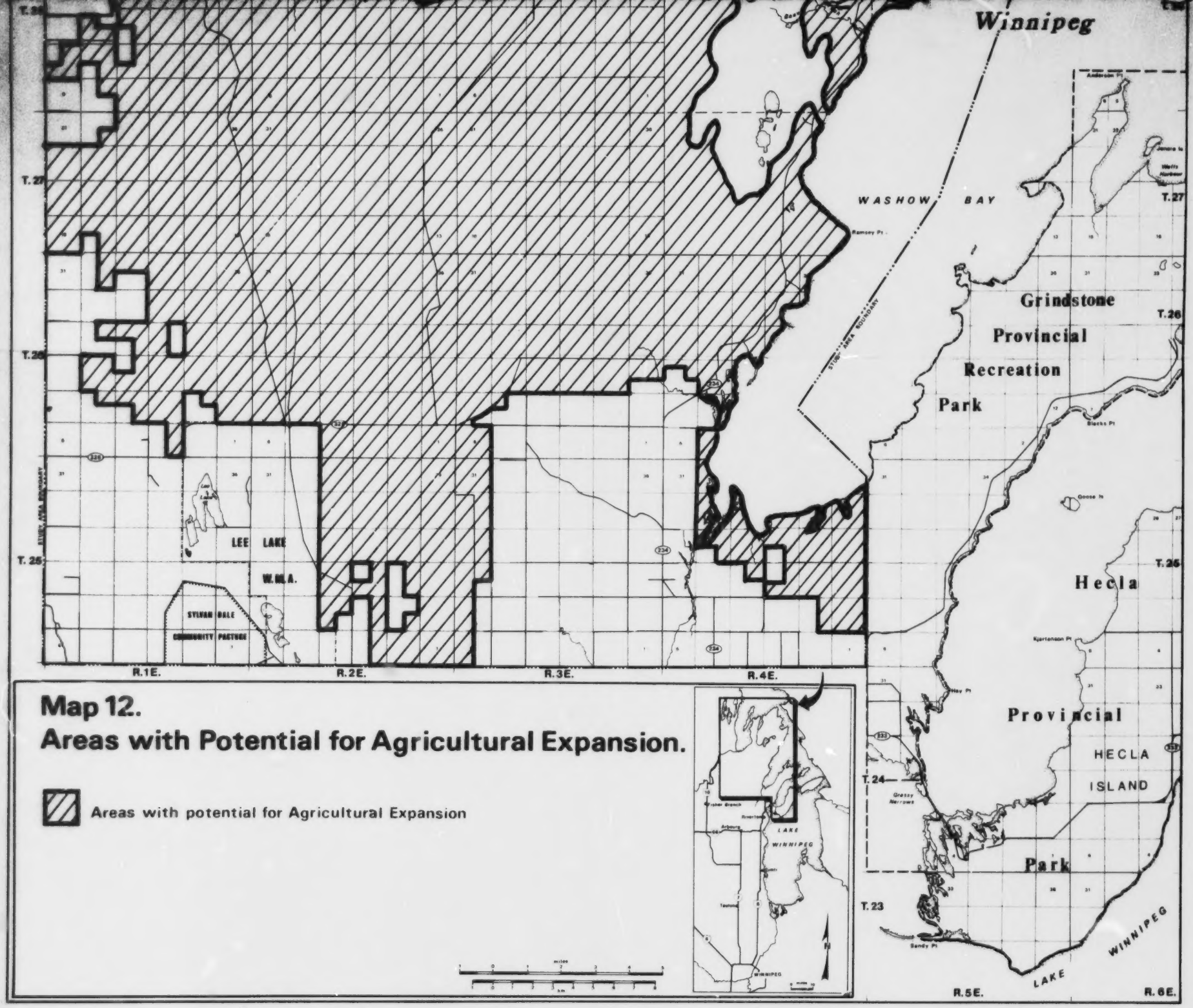

**Map 11.**

**Agricultural Land Capability**
**(Canada Land Inventory)**

**for legend see Appendix 2**




**Map 12.**
**Areas with Potential for Agricultural Expansion.**




## Map 12.
## Areas with Potential for Agricultural Expansion.

Areas with potential for Agricultural Expansion

Mineral Soils (Smith and Mills 1983)

The well to imperfectly drained Arnes, Arborg, Kinwow and Lettonia soils, CLI Class 2-3, are arable in their native state, and have only a moderate problem with tilth, wetness and permeability. Because these soils are frequently developed on thin clayey deposits over stony high lime till, they also have a continuing minor problem with surface stones on cultivated fields.

The poorly drained Balmoral, Fyala and Tarno soils are non-arable unless adequate drainage is provided (CLI Class 4W and 6W (3W)). These fine textured soils can be improved to Class 3 but will have a continuing, moderate severe problem with wetness and permeability.

The well to imperfectly drained very stony Chitek, Fairford, Garson and Inwood soils dominatly Class 4P, significant 5P, minor 6PR, are also useful mineral soils. They are developed on very to excessively stony, thin deposits of loamy, high lime glacial till overlying limestone bedrock. They occur in the form of prominent, north-south trending bedrock cored drumlins. These drumlins, interspersed with elongated depressions, filled with organic soils, become less prominent progressively northeast in the project area. They virtually disappear under thick blankets of organic soils, particularly in the area east of range 3E and north of township 27. These soils with the removal of surface stones, can be improved to Class 2 to 4, depending upon the initial degree of stoniness and depth of the glacial till to bedrock. The degree of difficulty in terms of developing these soils is significantly less than that of the associated poorly drained clayey soils and organic soils. Land clearing, including the removal of trees and stones, is significantly less expensive than the installation, improvement, and maintenance of drainage systems. So, while these soils may initially appear to be less attractive for agriculture, they are, on the other hand, more readily adaptive to agriculture production than either the associated poorly drained mineral and organic soils.

Organic Soils (Smith and Mills 1983)

The evaluation of organic soils for agriculture in the project area assumes that: (a) all organic soils in their native state have little or no agricultural capability, and (b) that factors affecting the degree of difficulty in reclaiming them are also important. This means an assessment of their continuing soil condition limitations after reclamation.

The most useful group, O3W, are the Cayer, Kircro and Stead soils that are derived from moderately decomposed fen type peats. These smooth, level, generally treeless, organic soils range from 0.6 to 3.7 meters in depth and are very uniform with respect to degree of decomposition and other chemical and physical characteristics. They are all underlain by clayey lacustrine sediments and because of this, peat subsidence is not a factor in assessing their agricultural suitability. The deeper Stead soils occur in the central depressional section of large peatlands and serve as a catchment to adjacent shallower Cayer soils and upland mineral soils. Because of this, they require a major reclamation effort to remove large volumes of excess water.

The Baynham, Okno group of organic soils are developed on moderately well decomposed forest peat. These densely tree covered, hummocky surfaced, woody organic deposits range in depth from about one meter to more than three meters. They occur on slightly better drained, upslope or very gently sloping positions in peatlands. Forest peat material is variable in composition. It is usually very dark brown to black in colour, amorphous in structure with variably thick layers of coarse, woody fragments of black spruce and tamarack roots and stems and is medium to strongly acid in reaction. Water movement in these soils is variable, being moderately slow to slow in the dense, well decomposed layers and very rapid in layers containing coarse woody fragments.

These soils are underlain by clayey, lacustrine sediments and peat subsidence is not a serious factor in assessing their agricultural capability.

Hummocky surface, dense tree cover, their variable layered structure, their high content of coarse woody fragments that are resistant to decomposition, contribute significantly to both the degree of development difficulty rating and to use for agriculture and, as a consequence, are classified as 04WL.

The third major group of organic soils (06WF) in the project area are those derived from thick (1.5 to more than 3 meters) deposits of extremely acid, relatively undecomposed sphagnum moss peat. These organic soils are usually underlain by smooth, clayey, lacustrine sediments. They occur on sites that are isolated from, or not influenced by, alkaline groundwater, under open stands of stunted black spruce and tamarack.

Sphagnum moss peat is usually well preserved, light brown in colour, very porous and extremely acid. At lower depths, it becomes reddish brown to dark brown, compacted and contains significant amounts of woody fragments. Forest and fen type peat material frequently underlies the sphagnum. Nutrient supply in these soils is very low. Water movement, particularly in the surface layers, is very rapid. Soils included in this group are dominantly Julius and Molson series.

## Summary

Soil conditions and the pattern of their distribution are in some cases limitations to the agricultural development of the study area. The more useful soils are in some cases distributed in small pockets or may be dissected by very poorly drained organic soils. Some of this problem could be eliminated by getting away from the traditional methods of installing infrastructure particularly roads and drainage on a per mile basis. Drainage systems could be installed to follow the pattern that the high class lands occur in, taking the most direct route to an outlet. Roads could correspond with the drains.

Although there are soils arable in their native state (requiring land clearing and/or stone picking) a major consideration for the study area would be the provision of an adequate drainage system.

There are approximately 108,000 hectares (270,000 acres) in total area designated as having potential for future agriculture expansion.

## Climate

Climate and the degree of climatic limitation is a major factor that directly affects the degree and intensity of agriculture which may take place. The degree of limitation for agriculture imposed by various climatic characteristics is best assessed by comparison with the median climate of southern Manitoba. Long term agricultural experience shows that this median climate poses no limitations to the production of regionally adapted dryland crops. Limitations and potentials for agriculture resulting from the various climatic conditions across Manitoba are synthesized into four broad agroclimatic regions (Maps 13-14 and Table 4).

The majority of the study area lies within the median climate with no climatic limitation for regionally adapted crops. Approximately 85 percent of the area identified as having potential for future agriculture expansion also lies within the median climatic region.

Table 4. General Climatic Parameters for Agroclimatic Subregions in Manitoba

| Climatic Subregion[1] | Degree of Limitation | Mean Annual Precipitation (MM) | Frost-Free[2] Period (days) | Degree Days Above 5.5°C |
|---|---|---|---|---|
| 1 | None | 410-620 | >90 | 1680-1330 |
| 2H | Moderate | 410-600 | >90 | 1445-1220 |
| 3H | Moderately Severe | 420-555 | 60-90 | 1250- 900 |
| 5H | Very Severe | 415-560 | <60 | <900 |

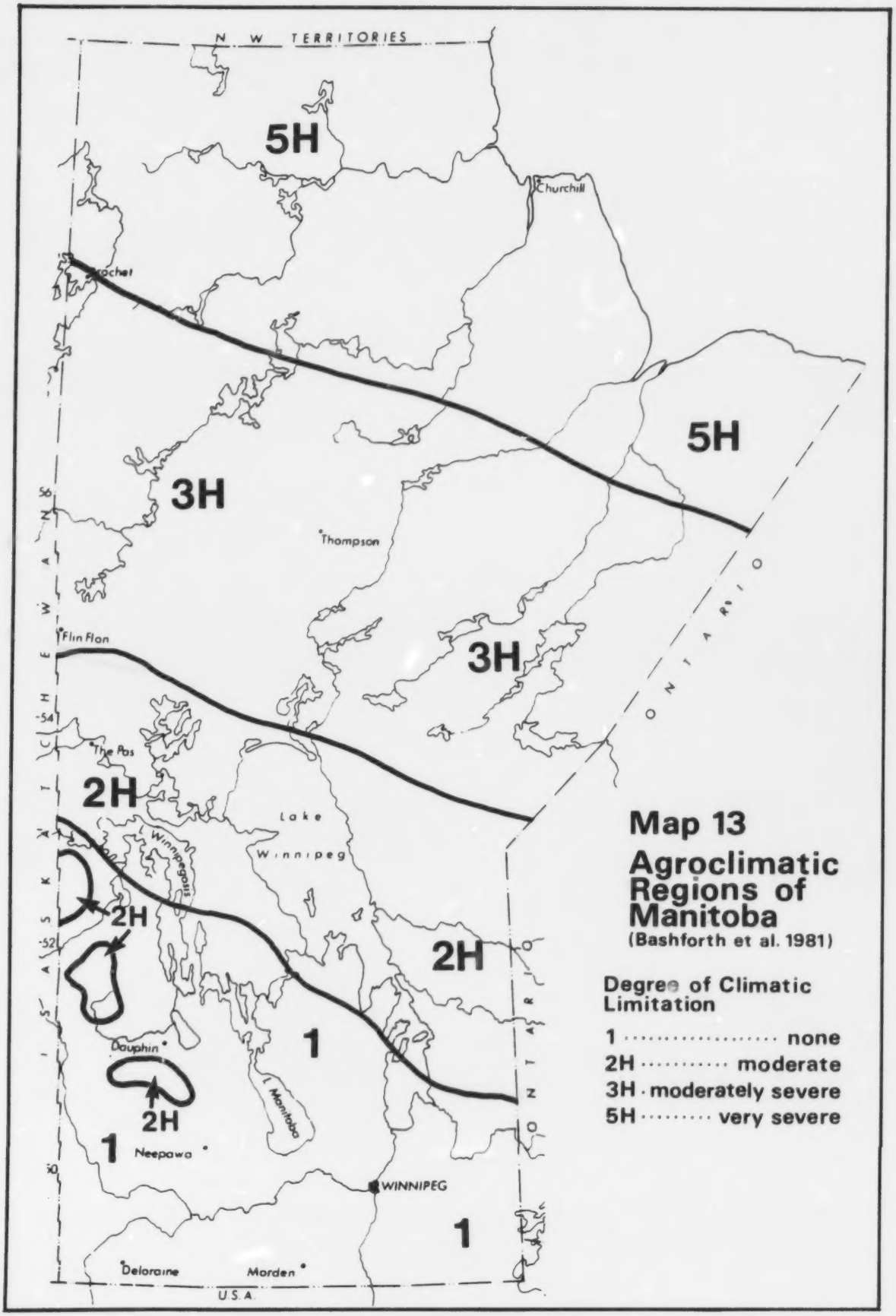
1.
1 Median climate, no limitation for regionally adapted crops. Climate is suitable to permit growth of special crops requiring high heat units and long growing season.

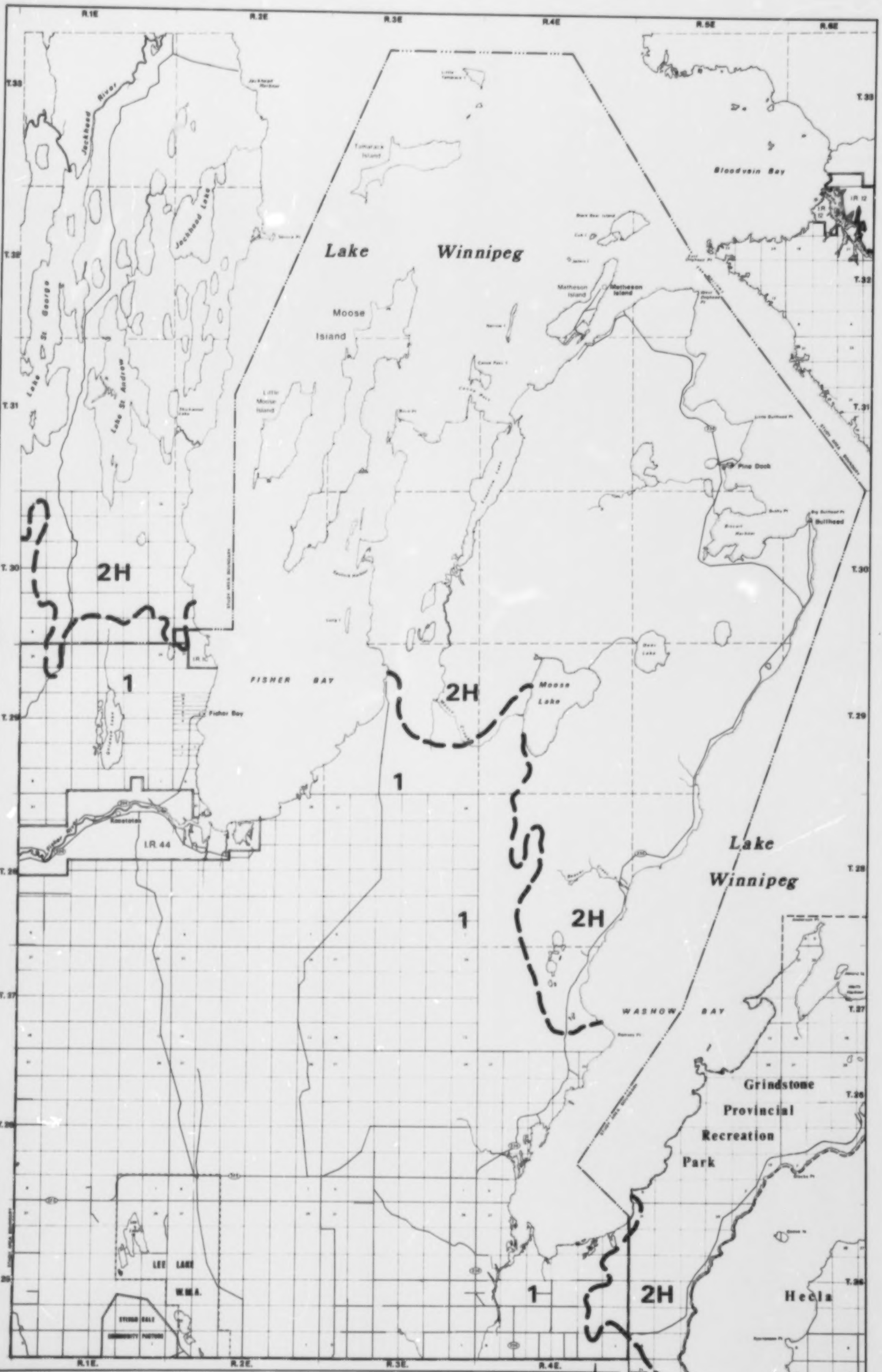
2H Moderate limitation for regionally adapted crops. Range of crops somewhat restricted by low temperature to short season grain crops, forage crops and root crops. Wheat is expected to suffer frost damage in 30 percent of the years.

3H Moderately severe limitation for regionally adapted crops. Range of crops severely restricted by low temperature to forages, early maturing grain crops and root crops. It is not practical to grow wheat because of frequency of damaging frost.

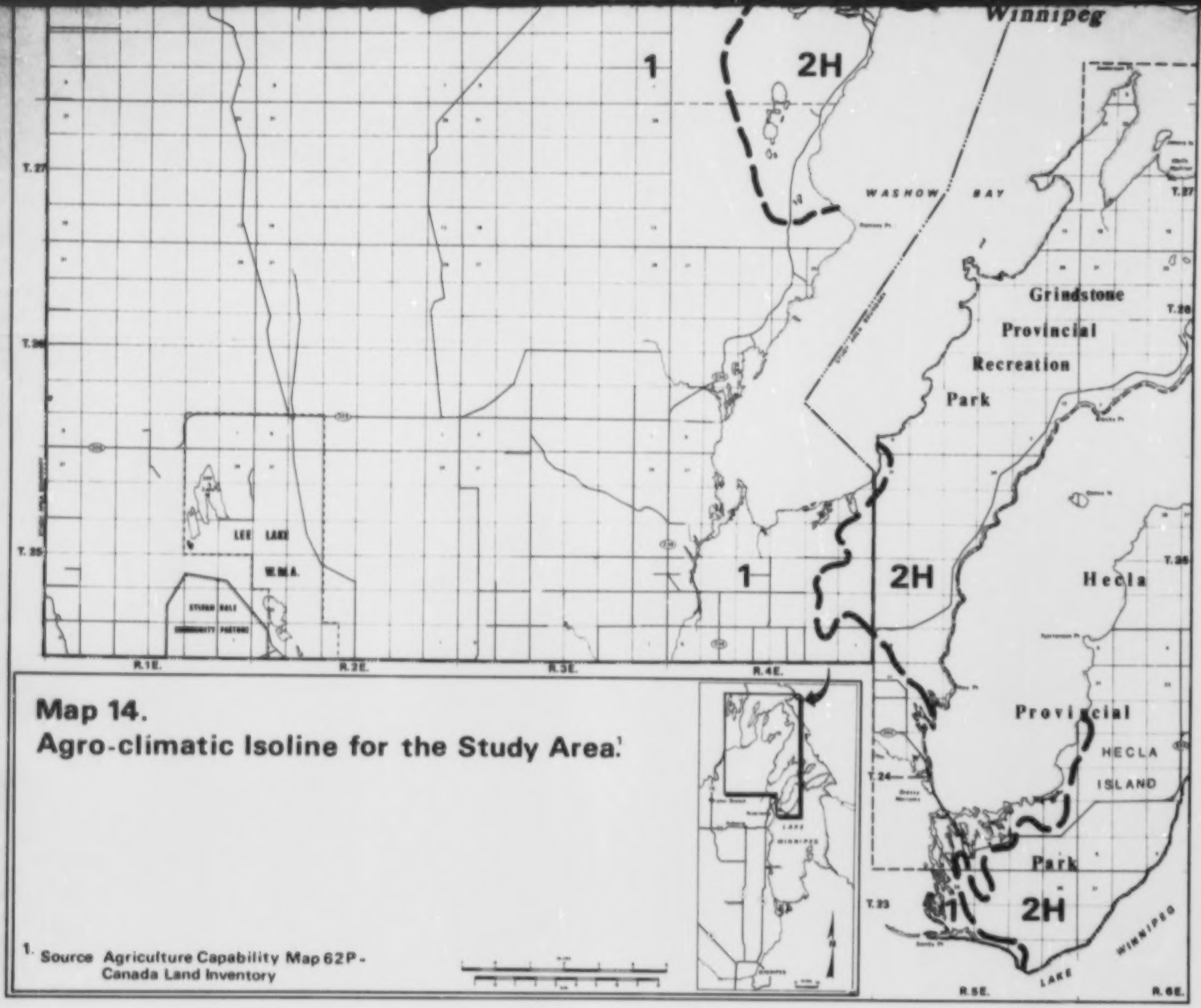
5H Very severe limitation for regionally adapted crops. Very high frost hazard limits arable agriculture to forage crops. Potential for native forage and browse for indigenous animals.

2. See Appendix 3 for Frost-Free period map and number of heat corn units.


N W TERRITORIES
5H
Churchill
Rochet
3H
5H
Thompson
Flin Flon
3H
ONTARIO
The Pas
2H
Lake
Winnipeg
L. Winnipegosis
2H
2H
1
Dauphin
L. Manitoba
2H
1
Neepawa
WINNIPEG
1
Deloraine
Morden
U.S.A.
SASKATCHEWAN
54
52
50
Map 13
Agroclimatic Regions of Manitoba
(Bashforth et al. 1981)
Degree of Climatic Limitation
1 ..... none
2H ..... moderate
3H . moderately severe
5H ..... very severe




**Map 14.**
Agro-climatic isoline for the Study Area




**Map 14.**
**Agro-climatic Isoline for the Study Area.**[1]

1. Source Agriculture Capability Map 62P - Canada Land Inventory

## Potential Crops and Livestock Production by Climatic Subregion
(G.Bashforth et al. 1981)

Climate Subregion 1

*"Climate essentially poses no limitation for regionally adapted crops."*

The study area in this zone is interspersed with areas presently being utilized for crop and livestock production. Because the various agricultural enterprises are already underway in the adjacent areas yield potential of specific crops and livestock gains may reasonably be expected to be similar based on climatological data and soil type.

There are no serious limitations to crop and livestock production. However, the fact that the study area is at the lower end of the range of the frost free period for the zone, presents a situation where management in respect to timeliness of operation will play a major role in the success of any cropping enterprise.

Cereal and Special Crops

As agriculture is already underway in adjacent areas, the yield potential of undeveloped land may reasonably be expected to be somewhat similar based on climatological data and soil data that are available. Similarly the kinds of crops that are adapted in the undeveloped areas may be related to those in adjacent areas (Table 5).

Horticultural Crops

Vegetables

Within this climate zone there is potential for the production of a wide range of vegetables. However, as the majority of the land resource being considered is located where the prevailing temperatures are at the lower end of the range for the zone the production of some of the heat sensitive crops will be restricted. Crops such as tomatoes, cucumbers, corn and peppers will require the use of the protective covering such as plastic mulch and tunnels to stimulate extra growth.

The greatest potential for crop production will come from the root crops (carrots, parsnips and rutabagas) and the cole crops (cabbage, cauliflower and broccoli). These crops are somewhat cold tolerant and will withstand most early frosts. Short season crops such as green peas, lettuce and snap beans also have potential for this zone. Average to above average provincial yeilds of the various crops can be expected depending on the soil resource.

The land resource for production of vegetable crops will be restricted to soil Classes 1 to 4 and organic soils. In mineral soils preference for production should be given to the lighter textured soils with provisions for adequate drainage. Lighter textured soils are much more suitable for mechanized operations which under present labor costs are a limiting factor in vegetable production. Supplementary irrigation will be a major component in the production program.

Within this climate zone there is potential for potato production for a variety of end uses. At the northern and northeastern portion of the zone prevailing temperatures tend to restrict the maturity and thus, the specific gravity of long season varieties. This will restrict the suitability for commercial processing unless variety development changes the growing season maturity relationship for cultivars suitable for processing. Commercial yield potential is comparable to provincial averages. Any production for seed table stock will need to practice timely top desiccation practices to assure acceptable tuber size and maturity. Suitable land resource will be restricted to soil Classes 1 to 4 with preference for well drained sandy loams to loams. If sands and coarse sands are used, irrigation would be recommended. Well drained fine textured soils would be suited for home garden or non-mechanized harvest operations.

Table 5. Average yields 1975-1979 and Zonation Trial Yields (Bashforth et al. 1981)

| Crops | Average Yield BU/A 1975-1979[1] | | Zonation Yield Data BU/A[2] | |
|---|---|---|---|---|
| Wheat | 27.9 | | 39.2 | |
| Oats | 49.7 | | 87.8 | |
| Barley | 42.8 | | 70.0 | |
| Rye | 28.0 | | 59.8 | |
| Buckwheat | 15.0 | | 40.3 | |
| Rapeseed | 20.5 | | 30.1 | |
| Triticale+ | 55.5 | | 97.0 | |
| Fababeans | 1500* | lb/A | 2903 | lb/A |
| Field Beans | 1000* | lb/A | 1730 | lb/A |
| Flax | 795 | lb/A | 1463 | lb/A |
| Lentils | 1000* | lb/A | 2000* | lb/A |
| Mustard | 840 | lb/A | 1177 | lb/A |
| Soybeans | 700** | lb/A | 1737 | lb/A |
| Field Peas | 1554 | lb/A | 1747 | lb/A |
| Sunflower | 1108 | lb/A | 2042 | lb/A |
| Canary Seed | 1000* | lb/A | 2000* | lb/A |
| Sugar Beet | 14.4 | t/A | - | t/A |

1. Yearbook, Manitoba Agriculture, 1979
2. Field Crop Recommendations for Manitoba, Manitoba Agriculture, 1981

*Estimated Yields

**Two years average yield from Agro-Man Soybean Project

+1979 date from contracting firm

## Small Fruit

Small fruit production presently underway in the fringe areas of this climatic zone indicate a good potential for the production of crops such as strawberries and raspberries. Commercial plantings of strawberries in areas such as Hadashville and McCreary under careful management are producing 8-10 thousand pounds on a pick-your-own basis. Pick-your-own operations for raspberries are just getting underway, thus, yield data is not yet available. However, raspberries have been grown successfully in the home gardens within these areas for many years.

In respect to a land base small fruit crops prefer the lighter textured soils with good internal drainage. In the case of strawberries irrigation is required not only to supply additional moisture during the critical periods of growth but also for protection against late spring frosts which destroy the fruit buds.

Winter survival of small fruit crops is a major factor and must be given full consideration in the management of these crops. No doubt substantial improvement can be made in this area through the selection of varieties more suitable to various regions.

The area of native fruit such as saskatoons and highbush cranberries with further investigational work on varieties and propagation could provide an additional potential in the future.

## Ornamentals

The production of ornamentals both those under environmentally controlled conditions (greenhouses) and those grown under outdoor operations has a strong potential for the land resource base under discussion. A successful commercial nursery operation in the Valley River (Dauphin) area has demonstrated the commercial opportunities of this enterprise. Various greenhouse operations throughout the northern portion of this temperature zone indicates the commercial potential especially for bedding plants. Greenhouse vegetable crops can be grown successfully, but due to high energy costs they are not an economic crop at the present time.

The land base for outdoor production particularly for the woody ornamentals will be restricted to the 1-4 class soils. Preference is given to the lighter textured sandy loam to loam soils that are well drained and lend themselves to mechanized harvesting and handling operations.

The availability of suitable water for greenhouse operations could be a limiting factor in some areas. Irrigation though not essential in nursery operations would be an asset especially on the soils with a high percentage of sand.

Shelterbelts well placed could provide winter protection and stimulate increased growth.

Sod production has potential in the area particularly in the organic soils.

## Forage Crops

Forage crops for both feed and seed are being produced extensively in this climatic zone already. The production potential is limited more by the physical characteristics of the soil than it is by the climate. The grazing season in this zone normally ranges from 120 to 130 days on tame pastures with a potential stocking rate of 2.7 to 3.2 animal units per hectare (1.1 to 1.3 animal units per acre). With that stocking rate it has been possible to obtain average daily gains of 0.9 to 1.1 kilograms (2.0 to 2.4 pounds) over the entire grazing season (Table 6). Hay production averages around 5 tons per hectare (2 tons per acre) with a potential of 8.6 tonnes per hectare (3.8 tons per acre) on well managed stands.

The major forage species used would be alfalfa, bromegrass, and timothy with smaller amounts of wheatgrasses, orchardgrass, birdsfoot trefoil, red clover and alsike clover being utilized. Currently the majority of the conserved feed is put up as a hay product and further development in this climatic zone will probably continue mostly with the hay product. Haylage will be used where localized moisture conditions prevent the proper curing of a hay product.

In this climatic zone there are currently in the order of 28,000 hectares producing ten different forage crops for seed. Expansion of this acreage is limited only by the market potential of the individual crops.

Table 6. Pasture Yields in Climatic Zone 1[1]

| Class of Cattle | Location | Year | Days Grazing | Average Daily Gain[2] KG/Head/Day | (LB/Head/Day) |
|---|---|---|---|---|---|
| Steers | Oakburn | 81 | 123 | 1.03 | (2.26) |
| Steers | Oakburn | 80 | 123 | 1.06 | (2.34) |
| Steers | Oakburn | 79 | 123 | 1.01 | (2.23) |
| Steers | Oakburn | 78 | 116 | .89 | (1.97) |
| Steers | Ashern | 80 | 134 | 1.12 | (2.46) |
| Steers | Ashern | 79 | 122 | 1.11 | (2.45) |
| Steers | Ashern | 78 | 120 | 1.02 | (2.25) |
| Steers | Ashern | 77 | 128[3] | 1.08 | (2.38) |
| Steers | Binscarth | 78 | 121 | .99 | (2.19) |
| Steers | Binscarth | 77 | 129 | 1.16 | (2.55) |
| Steers | Binscarth | 76 | 132 | 1.15 | (2.53) |
| Steers | Binscarth | 75 | 117 | .96 | (2.11) |
| Steers | Binscarth | 74 | 56 | 1.03 | (2.28) |
| Calves | Oak Lake | 77 | 144 | .96 | (2.12) |
| Calves | Oak Lake | 76 | 154 | .93 | (2.05) |
| Calves | Oak Lake | 75 | 153 | .96 | (2.11) |
| Calves | Oak Lake | 74 | 134 | 1.03 | (2.27) |
| Calves | Oak Lake | 73 | 96 | 1.08 | (2.39) |
| Calves | Fork River | 81 | 148 | 1.18 | (2.60) |
| Cows | Oak Lake | 77 | 144 | .52 | (1.15) |
| Cows | Oak Lake | 76 | 154 | .60 | (1.33) |
| Cows | Oak Lake | 75 | 153 | .64 | (1.43) |
| Cows | Oak Lake | 74 | 134 | .74 | (1.64) |
| Cows | Oak Lake | 73 | 96 | .86 | (1.90) |
| Cows | Fork River | 81 | 148 | .68 | (1.50) |

1. Data is selected from various Grassland Society Projects and represents the gains achieved on improved tame pastures

2. Annual differences reflect in part, weather and growing conditions for the forage crops and the quality and condition of the cattle on the pasture

3. Updated figure personal communication G. Breaky.

Livestock

Horses and ruminants (cattle, sheep, and goats) are already being produced extensively in this climatic zone. Ruminant production potential will be limited in any region by its forage production capabilities. Grazing seasons in this zone range from 120-130 days on tame pastures, with a potential of 2.7-3.2 animal units per hectare (1.1-1.3 animal units per acre) with an average daily gain of 0.9-1.1 kg. Forage production averages around 5 t/ha, with a potential of 8.6 t/ha on well-managed fields.

In the more remote, less developed areas of this zone, predation by coyotes, wolves and bears has been a problem. Insect pests pose a serious constraint to optimum production during the grazing season, although control methods provide some relief.

For the non-ruminants there are no environmental or predatory deterrents to production of swine or poultry.

Climatic Subregion 2H

*"Climate has a decreasing heat unit and slightly shorter growing season. This climate results in a moderate limitation that restricts the range of crops that can be grown."*

The land resource base in this zone is located immediately north of the Class I climate zone. The range of crops will be somewhat limited owing to shorter frost free period. However, longer daylight hours provide partial compensation allowing for the production of certain crops needing a longer growing season in more southern areas.

The utilization of organic soils in this zone will be more limited than those of the Class I climatic zone due to their sensitivity to early frosts and the slow rate at which they warm-up in the spring. Weed control will need special consideration as presently used soil incorporated herbicides are ineffective in organic soils.

Cereal and Special Crops

The range of crops will be similar to those in Class I climatic zone but somewhat limited owing to a shorter growing season (Table 7). Crops requiring greater heat units and longer growing seasons are not suited for this region. Owing to the short growing season, it is anticipated that spring wheat will receive frost damage in about 30 percent of the years that it is grown.

Horticultural Crops

Vegetables

Vegetable crop potential in this area is restricted to the more frost tolerant types such as root crops, cole crops and the various types of lettuce. Short season crops of green peas and snap beans also have a potential but in the case of snap beans would be restricted to the home garden and for fresh market and not for processing. The short harvest period would restict its use in the processing industry. Observations reported from demonstrational trails of vege-

tables in the Pasquia Development area during the late 1950's indicate productivity of average to above average yields. Growth rates of the various crops because of the long daylight hours is much more rapid and tend to compensate for the shorter growing season to that of more southern regions. Yields and quality of crops could no doubt be improved through a variety testing program. Little work has been carried out in this respect.

The greatest potential for production will be in the lighter textured sandy loams and the alluvial zones along the various streams. In the lighter textured soil types the use of supplementary water would be beneficial to optimize growth and quality.

Potential yield for potatoes based on small plot yield results is good (Table 8). Earliest maturing varieties having some advantage in maturity and specific gravity. Later maturing varieties which yield well, i.e., Red Pontiac tend to be excessively wet and soggy. This variety, when grown in the 2H zone will be extremely susceptible to shattering. Production and maturity would be assisted by green sprouting the seed prior to planting. Careful attention to desiccation or top removal to prevent oversize tubers and to achieve acceptable maturity will be needed. It is anticipated yield may have to be restricted by desiccation to minimize the potential loss from fall frosts.

Suitable land resources will be restricted to the soil classes 1-4 with preference for well drained sandy loams or loams. If sands and coarse sands are used, irrigation would be recommended. Well drained fine textured soils would be suited for home gardens or small non-mechanized harvest operations.

Table 7. Average and Zonation Yields of Cereal and Oilseed Crops[1] (Bashford et al. 1981)

| | Average Yield in BU/A Obtained from Washow Bay and Red Rose Areas[2] | Zonation Yield Data in BU/A at The Pas[3] |
|---|---|---|
| Wheat | 25-28 | 61* |
| Oats | 50-63 | 88* |
| Barley | 38-45 | 86* |
| Rapeseed | 16-22 | 30** |
| Flax | 15-22 | 35* |
| Rye[4] | - | 58*** |

1. Yields are for field crops from Class 1, 2 and 3 and organic soils that could be used in estimating crop production potential in the Class 2 climatic zone if sound management is practiced.
2. B. McCannel 1981. Survey, Northern Agricultural Crops Yield Arborg, Manitoba
3. 1966-70, Manitoba Zonation Trials
4. J. Ellis 1968. Field Crop Variety Trials in the Pasquia Area

*5 year average yield (1966-1070) from Manitoba Zonation Trials

**Estimated yield of Polish type canola.

***5 year average yield (1957-1967)

Table 8. Small Plot Potato Variety Yield Trials, The Pas (1957-62) (Bashford et al. 1981)

| | Type (CWt/A) | | | | |
|---|---|---|---|---|---|
| | Burbank | Pontiac 2 | Kennebec | Warba | Norland |
| | 231 | 297 | 241 | 220 | 270 |
| | 218 | 271 | 200 | 203 | 250 |
| | 83 | 261 | 254 | 87 | 103 |
| | 137 | 135 | 160 | 160 | 231 |
| | 216 | 236 | 250 | 184 | |
| | 194 | 216 | | | |
| | 151 | | | | |
| | 196 | | | | |
| Average Yield | 178 | 236 | 221 | 171 | 214 |

Small Fruits

Small fruit such as raspberries and strawberries have been grown successfully in this climatic zone. In the case of strawberries winter hardiness will be a limiting factor. However, with sound management practices now being employed in southern Manitoba the potential for consistency in production is quite good. The selection of varieties better adapted to this zone could provide significant improvement especially in the area of winter hardiness.

The development of native fruit such as highbush cranberries, saskatoons and other crops like gooseberries and currants have potential especially for small pick-your-own operations.

Soils with good internal and external drainage are essential to promote vigorous growth. Production will be restircted to the Soil Classes 1-4 with particular emphasis on the lighter textured and alluvial soils. Small protected areas that will maintain adequate snow coverage throughout the winter months will reduce risk from winter injury.

Ornamentals

The potential in ornamentals in this zone is in the production of both nursery stock and bedding plants for local plantings. Nursery stock will be restricted to the more hardy types but there is a wide range of plant material suitable to this region. There is also a wide range of native material which if put through a selection program could be propagated as hardy stock for local use. The utilization of bedding plants by local residents is increasing with the types of plantings showing similar trends to those in southern Manitoba. Growth is somewhat slower during the early spring than further south because of the short daylight hour. However, this is offset by the later outdoor planting season due to late spring frosts.

The soil base for nursery stock would be restricted to the well drained portions of Classes 1-4. Soils that lend themselves to use of mechanized production equipment will be preferred. The organic soils have a potential for sod production.

## Forage Crops

Currently there is relatively little forage grown in this region except around the Pasquia settlement. However, there is considerable soil within this zone which would support the production of forage crops. It has been demonstrated that forage yields of between 5 to 7 tonnes per hectare (2 to 3 tons per acre) can be expected. The grazing season on tame pastures is between 100 and 120 days with a carrying capacity of about 3 animal units per hectare (1½ animal units per acre) (Table 9).

The forage legume species most adapted to this area include alfalfa, alsike clover, sweet clover, and red clover. There are also quite a number of grasses which are well adapted to this zone including bromegrass, meadow fescue, timothy, intermediate wheatgrass, and reed canary grass. The legumes have produced more than the grasses or grass legume mixtures in this area, however, the grass legume mixtures would be preferred for a curing of the hay product. An increased emphasis in haylage production would be beneficial to ensuring an improved feed product.

In the past, there has been forage seed production of both timothy and Kentucky bluegrass in the Pasquia settlement area. The yields of these two crops reportedly were good but production of these crops has now ceased. Recently there has been no attempt to re-establish production in the area due, in part, to the distance from the major Winnipeg cleaning firms.

Table 9. Pasture Yields in Class 2H Climatic Zone[1]

| Class of Cattle | Location | Year | Days Grazing | Average Daily Gain[2] KG/Head/Day | (Lb/Head/Day) |
|---|---|---|---|---|---|
| Steers | The Pas | 1979 | 131 | .88 | (1.95) |
| Steers | The Pas | 1978 | 125 | 1.03 | (2.28) |
| Heifers | The Pas | 1981 | 156 | .94 | (2.08) |
| Heifers | The Pas | 1979 | 131 | .90 | (1.99) |
| Heifers | The Pas | 1978 | 125 | .99 | (2.18) |
| Calves | The Pas | 1981 | 156 | 1.02 | (2.25) |
| Calves | The Pas | 1979 | 131 | .97 | (2.14) |
| Cows | The Pas | 1981 | 156 | .62 | (1.37) |
| Cows | The Pas | 1979 | 131 | .52 | (1.15) |

1. The data is from the Pasquia Grassland Society project at The Pas
2. Annual differences reflect in part, weather and growing conditions for the forage crops and the quality and condition of the cattle on the pasture

Livestock

For ruminants and horses, where the soil supports forage production, yields can be expected to range from 5-7 t/ha. Carrying capacity of improved land would be about 3 animal units/ha for 100-120 days, while carrying capacity of unimproved land could vary from 0.1-0.3 animal units/ha. Gains on pasture could be comparable with those in zone 1 (e.g., 0.9-1.1 kg/head/day) under optimal conditions.

Because of increased predatory pressures, from wolves and bears in particular, insect pests and the general lack of animal health care delivery systems, morbundity and mortality could be expected to be higher than that normally experienced in zone 1.

For the non-ruminants, again there are no general limitations to swine or poultry production that could not be experienced in the present areas of production.

Summary

Within the Class 1 climatic zone there are no significant limitations anticipated to crop and livestock production on the land resource base situated outside the established agricultural areas. Productivity is expected to be comparable to that in the adjacent agricultural developed areas. As most of the land is located in areas at the lower end of the range of frost free period timeliness of operation will play a key role in the success of any cropping program. Approximately 85 percent of the area identified as having potential for agriculture expansion occurs within the Class 1 subclimatic region.

The potential for crop production on lands situated in Class 2H climatic zone is substantial but somewhat more restrictive to that in the Class 1 zone. The shorter frost free period and lower total heat units will increase the risk in growing cereal crops such as spring wheat. Forage crops are expected to produce at a normal level under these conditions. The utilization of organic soils will be limited due to their sensitivity to early frosts and the slower rate at which they warm-up in the spring. There will also be a longer development period required to bring the organic soils into productivity than that required for mineral soils.

There are no serious limitations to livestock production but increased possible predatory pressures, particularly from wolves and bears, as well as insect pests can be expected.

## Infrastructure and Capital Requirement

There is about 108,000 hectares (270,000 acres) in the study area with potential for agricultural use. However, infrastructure costs and capital requirments will affect and may dictate the kinds of agricultural use and intensity this potential acreage may ultimately experience.

Assumptions

1. Crop producing soils will generate a gross value of production of $100.00/acre.

2. Soils suited to livestock production will generate a gross value of production of $35.00/acre.

3. Class 2 and 3, 03 and 70 percent Class 4 and 04 soils will be cropped.

4. Thirty percent Class 4, 04 and all Class 5, 05, 6 and 06 will be utilized for livestock.

The following describes and delineates areas of low, medium and high infrastructure and capital costs (Map 15).

I. Area of low infrastructure and capital costs

Agricultural Use - 80 percent of the total area outlined as suitable for agriculture could be developed for livestock production (beef).

Cost - Under native grazing developments costs within this defined area would be for fence construction @ $2,000/mile.[1]

Area - 216,000 acres.

Private Cost - Assuming fencing every mile:
- 422 sections @ 3 miles as fence can be used for bordering mile on adjacent section
- 1266 miles @ $2,000 = $2,532,000

Public Cost - All infrastructure costs would be dependent upon further detailed study to determine that actual miles or kilometers of the various infractures required.

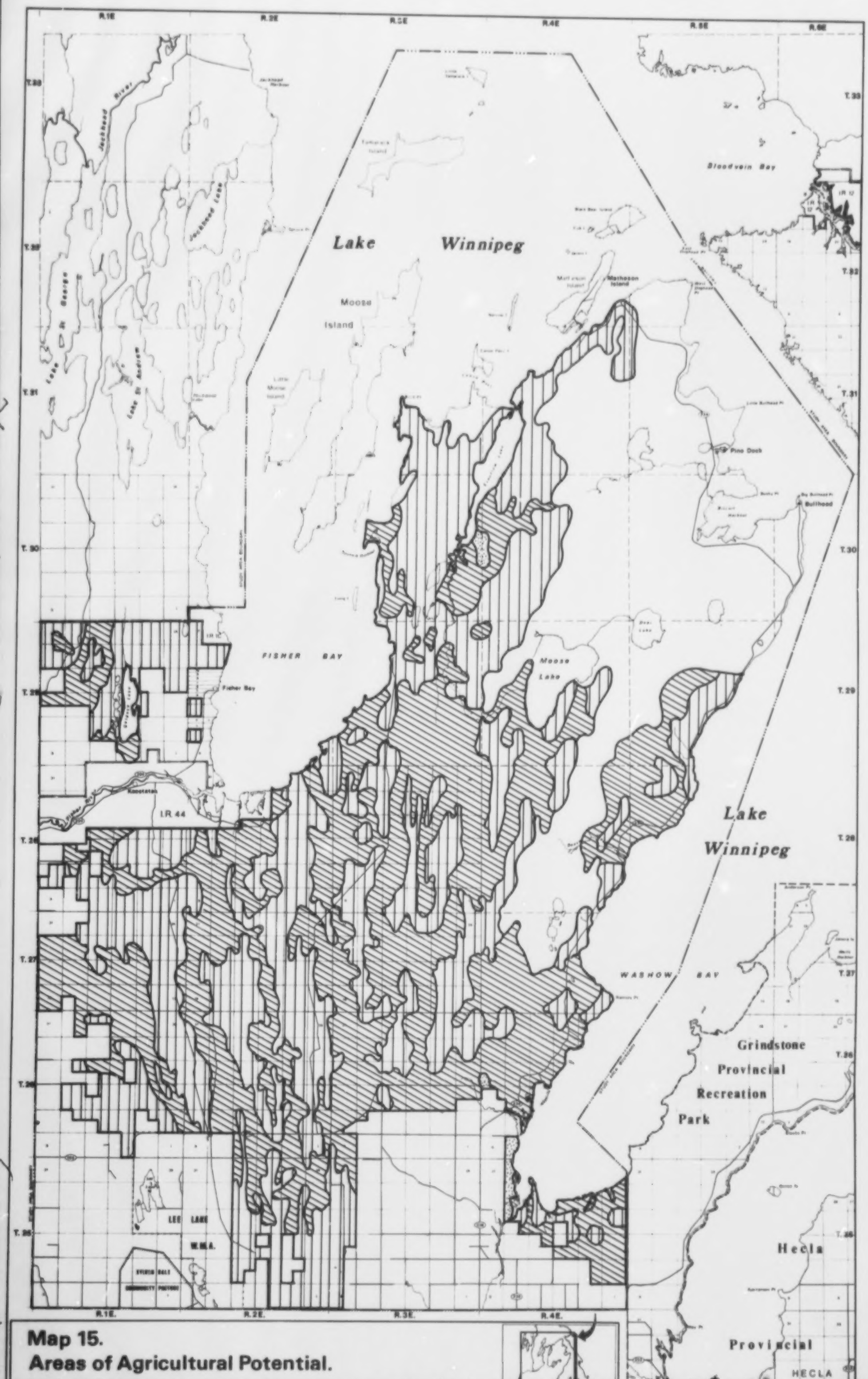
Today costs for infrastructures are:

| | |
|---|---|
| Major Road | - $100,000/km (costs of new Beaver Creek Road) |
| Access Road | - $ 10,000/km |
| Major Drain | - $ 50,000/km |
| Smaller Drain | - $ 5,000/km |
| Hydro | - $ 6,250/mile |
| Telephone | - $ 1,875/mile |

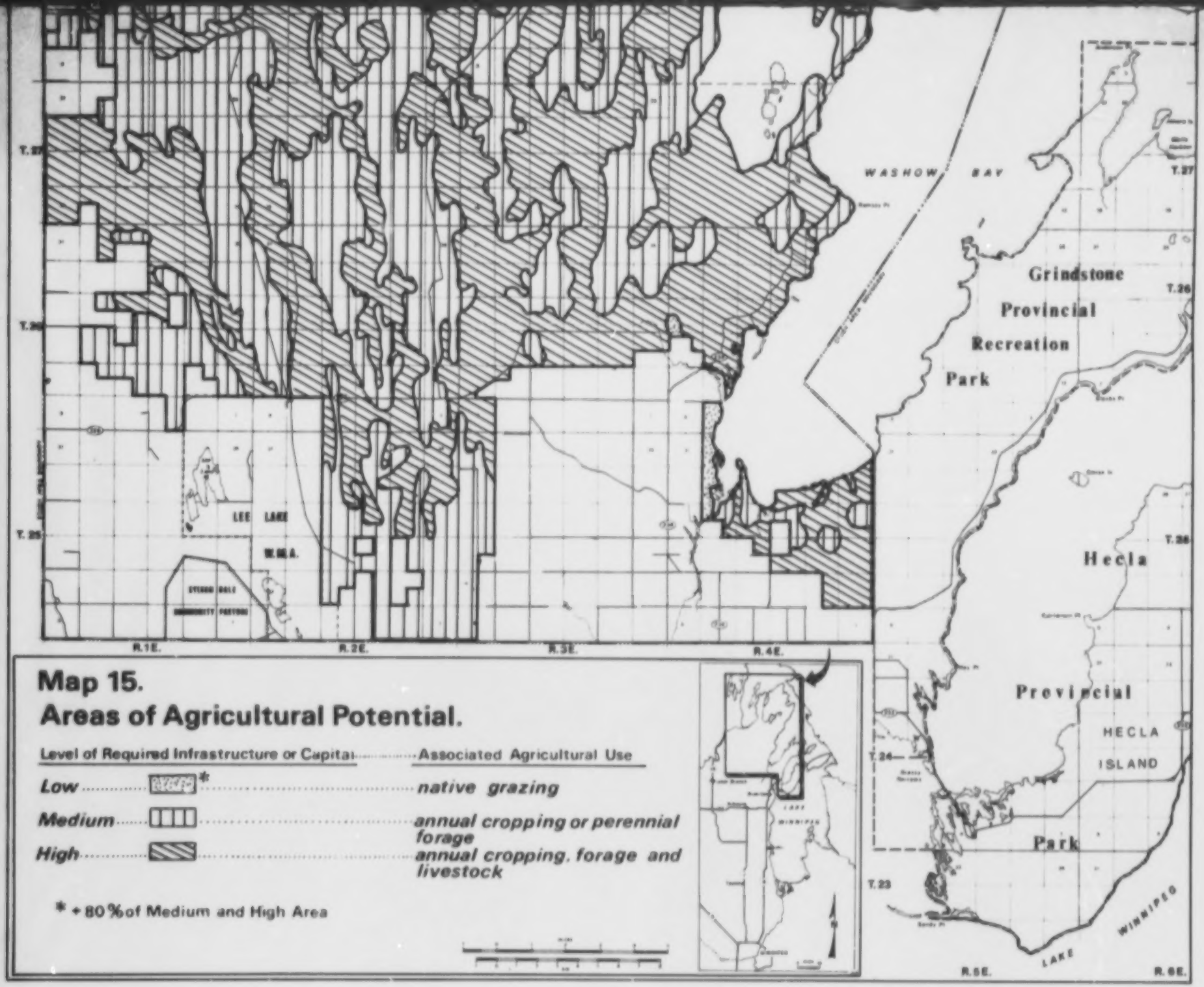
- Roads and drains could be combined to lower overall costs.

- Telephone costs quoted are for one line only, additional costs would be required for major service.

[1] Note: Without development improvements the native carrying capacity makes this option questionable.




**Map 15.**
**Areas of Agricultural Potential.**




## Map 15.
## Areas of Agricultural Potential.

| Level of Required Infrastructure or Capital | Associated Agricultural Use |
|---|---|
| *Low* * | *native grazing* |
| *Medium* | *annual cropping or perennial forage* |
| *High* | *annual cropping, forage and livestock* |

* + 80 % of Medium and High Area

II. Area of moderate infrastructure and capital costs

Agricultural Use - Areas within the outlined area suitable for agriculture could be further developed for annual cropping or perennial forage.

Cost - Costs associated with further development would be for knock down, pile and heavy discing. Costs per acre would vary from a low of $56/acre for those acres within the burned out area to high of $225/acre for those acres within heavy treed areas.[1]

Area - Soils suited for further development as outlined would be Class 2 - 28,000 acres, Class 3 - 23,000 acres, 70 percent Class 4 - 44,800 acres for a total of 95,800 acres.

Private Cost - Knock down, pile and disc.

a) Burn area[2] - Class 2 = 15,000 acres
Class 3 = 7,500 acres
70% Class 4 = 20,650 acres
Total ----- 43,150 acres @ $56/acre
= $2,416,400

b) Treed Area - Class 2 = 13,000 acres
Class 3 = 15,500 acres
70% Class 4 = 24,150 acres
Total ---- 52,650 acres @ $225/acre
= $11,846,250

Public Cost - All infrastructure costs would be dependent upon further detailed study to determine the actual miles or kilometers of the various infractures required.

Today costs for infrastructures are:

| | |
|---|---|
| Major Road | - $100,000/km (costs of new Beaver Creek Road) |
| Access Road | - $ 10,000/km |
| Major Drain | - $ 50,000/km |
| Smaller Drain | - $ 5,000/km |
| Hydro | - $ 6,250/mile |
| Telephone | - $ 1,875/mile |

- Roads and drains could be combined to lower overall costs

- Telephone costs quoted are for one line only, additional costs would be required for major service.

[1] Figures from Agricultural Crown Lands Branch

[2] Burn area figures are approximations (Map 9)

III. Area of high infrastructure and capital costs

Agricultural Use - This area would be suited to annual cropping, forage and livestock production.

Costs - Costs associated with this area are to provide land clearing, major farm drains, field ditches, sub-surface drains, and any water leveling control structures deemed necessary. $400-$500/acre would be costs associated with this development.

Area - Soils requiring this development are: 03-53,000 acres, 04-30,000 acres, 06-40,000 acres and 4W6W(3W) - 14,000 acres for a total of 137,000 acres.

Private Costs - Land clearing, development and drainage

| | | |
|---|---|---|
| 03 | = | 53,000 acres |
| 04 | = | 30,000 acres |
| 06 | = | 40,000 acres |
| 4W, 6W(3W) | = | 14,000 acres |
| | | 137,000 acres @ $450/acre = $61,650,000 |

Public Cost - All infrastructure costs would be dependent upon further detailed study to determine the actual miles of the various infractures required.

Today costs for infrastructures are:

| | |
|---|---|
| Major Road | - $100,000/km (costs of new Beaver Creek Road) |
| Access Road | - $ 10,000/km |
| Major Drain | - $ 50,000/km |
| Smaller Drain | - $ 5,000/km |
| Hydro | - $ 6,250/mile |
| Telephone | - $ 1,875/mile |

- Roads and drains could be combined to lower overall costs

- Telephone costs quoted are for one line only, additional costs would be required for major service.

## Production Analysis

This analysis (Table 10) will consider gross value of production that can be generated from various soil types in the study. Given this gross value of production, a multiplier effect then will be used to show the total spin off effect that agricultural development would have on the economy. The multiplier effect is used to demonstrate the impact agricultural production has on the rest of the economy; e.g., manufacturing (fertilizers, pesticides), processing (meat packing, rapeseed crushing, etc.).

Table 10. Annual Production and Gross Value of Production

| Soil Class | Acres Mineral | Acres Organic | Total Value of Production Per Acre | Total Value of Production Total | Multiplier Effect on Economy $1.7755 |
|---|---|---|---|---|---|
| 2 | 28,000 | 53,000 | 100 | 2,800,000 | 4,971,400 |
| 3 | 23,000 | 53,000 | 100 | 7,600,000 | 13,493,800 |
| 4 | 78,000 | 30,000 | 70%-100<br>30%- 35 | 7,560,000<br>1,134,000 | 13,422,780<br>2,013,417 |
| 5 | 5,000 | — | 35 | 175,000 | 310,713 |
| 6 | 13,000 | 40,000 | 35 | 1,855,000 | 3,293,553 |
| Total | 147,000 | 123,000 | | 21,134,000 | 37,505,663 |

## Concerns and Issues

1. Commitment of Land to Alternate Uses

Long term commitments of land to alternate non-agricultural uses, for example Order-in-Council designations such as provincial forests or wildlife management areas may restrict or eliminate future development of these lands for agricultural purposes. Some of the areas within the map area having potential for agriculture already have previous allocated uses.

It is also important to have drainage and access availability through some of the long term non-agriculturally committed land to facilitate future agriculture infrastructure. For example, drains from an agricultural area may have to cross non-agricultural land to an outlet at the lake.

2 Infrastructure

It should be noted that detailed studies are required to determine actual costs of infrastructure for the area, for example, a drainage survey should be conducted outlining the area's watersheds, drainage requirements, and drainage costs, similarly for roads, telephones, etc.

Due to the fact that there is a difference in elevation between land levels and lake level it is assumed that it is possible to drain the area. It is also assumed that some of the existing drainage system could be utilized in an expansion of the drainage for the area (Map 6).

The maintenance and upgrading of drainage systems is an important factor influencing the degree of agricultural activities which may take place. Maintenance of drains, particularly clearing of debris, brush and beaver dams.

is required. In some instances impaired flow in an existing drain forces water on alternate routes. An example of this within the study area is the drain known as the 2 mile drain in TWP 26, RGE 3E.

3. Legal Surveys

Some of the land in the northern portion of the study area has not been legally surveyed. Therefore before an allotment of land could take place, a legal survey may be required.

4. Economic Conditions and Capital

If agricultural development is to occur then the associated infrastructure development costs would require the availability of sufficient capital through the private and public sectors.

The development of land will be dependent upon the economic conditions of the times. The provision of funds for land clearing and associated infrastructural developments are all dependent upon the general economic conditions and the economic returns that can be expected from bringing lands into production. The agriculture attractiveness of an area would improve as economic conditions improve.

## Summary

Within the Washow-Fisher Peninsula Study Area, there is a total land area of approximately 213,000 hectares (527,000 acres). Approximately 108,000 hectares (270,000 acres) have been identified as having potential for future agricultural expansion.

The majority of the area identified as having potential for agriculture, approximately 85 percent lies within a Class 1 subclimatic region. Within this area there are no significant limitations for regionally adapted crops and the productivity of crops and livestock is expected to be comparable to that of adjacent agriculturally developed areas. The remaining 15 percent of the area identified for agriculture lies within a 2H subclimatic region which has moderate limitations for regionally adapted crops. Forage crops are expected to produce at normal levels under these conditions but the higher risk of frost will increase the risk in growing cereal crops. There are no major limitations for livestock production but possible predatory pressures, particularly from wolves and bears as well as insect pests can be expected.

There are approximately 59,000 hectares (147,000 acres) of mineral soils and 49,000 hectares (123,000 acres) of organic soils within the area identified as having potential for future agricultural expansion. Although there are soils arable in their native state, a major consideration for the study area would be the provision and maintenance of an adequate drainage system. To reduce the costs of infrastructure, the major drains could follow the pattern which the soils occur in and the associated roads and utilities could then correspond with the drains.

Demand for the area is expected to come from local farmers as well as from southern Manitoba farmers. There is little or no expansion potential remaining in the areas presently utilized for agricultural purposes. This, combined with high land prices, increases the attractiveness of this area for those looking for a land base to farm. Northern Manitoba represents one of the five important areas in Canada having untapped potential for arable uses.

The development of land will be dependent upon the general economic conditions of the times, the availability of funding, and the returns which can be expected. The agricultural attractiveness of this area would improve as the economic conditions improve. The major costs of infrastructure and capital requirements are somewhat offset by the benefits which can be expected. The total value of production is estimated at $21,124,000 per annum with a spinoff effect to the economy estimated at $37,505,663 per annum.

# SECTION 3. FISHERIES

## Introduction

The existing fishery resource within the Washow-Fisher Peninsula study area is concentrated in Lake Winnipeg. The fishery resource is commercially utilized during summer, fall and winter seasons by fishermen who are permanent or seasonal residents of the area. Species of major commercial importance are pickerel, sauger and whitefish. Pike, perch, freshwater drum, tullibee, maria, mullets, goldeye, catfish and bullheads are also taken and have some commercial value. Sturgeon, quillback suckers and white bass also occur. There are large populations of forage fish (minnows) present. The most common are shiners and trout perch.

Lake Winnipeg has been divided into various regulatory areas that delineate seasons, mesh sizes and harvest quotas. The Washow-Fisher study area includes portions of three regulatory areas that are fished during three commercial seasons. There are individual quotas of pickerel, sauger and whitefish allocated to a limited number of fishermen within these areas (Table 11 and Map 16). The harvest of other fish species is not limited by quota.

Table 11. Allowable Commercial Fishery Harvest

| Season | Regulatory[1] Area | Number of Fishermen | Individual Quota kgs. | Total Quota kgs. |
|---|---|---|---|---|
| Winter | D | 218 | 4,090 | 891,620 |
| Fall | D | 194 | 3,810 | 739,140 |
| Summer | H | 105 | 3,630 | 381,150 |
| Total | | 517 | | 2,011,910 |

1. See Map 16

The total allowable quota is 2.0 million kgs. This quota comes in part from the area of Lake Winnipeg included within the Washow-Fisher Study Area. The major portion of the allowable quota in regulatory areas D - winter, D - fall, and H - summer are taken within the Study Area. The harvest of quota species has averaged 88 percent of the allowable for the past five years. The harvest on non-quota species varies widely with market demand and price. Of the non-quota species, pike are the most valuable and from a marketing point of view the most stable.

There are populations of pike and perch in Moose Lake, Deer Lake and Goldeye Lake. These lakes are commercially fished on an annual basis. General permits are issued to one operator per lake to fish for a short period of time during the winter season. The harvest is minimal.

Recreational angling is not of major significance within the Washow-Fisher Peninsula study area at the present time, although there is potential for future development.

There is one trout farmer licenced to operate in the southwest corner of the study area.

## Areas of Existing Prime Fish Habitat

Areas of significant fish habitat include:

1. Those portions of Lake Winnipeg within the study boundaries are important spawning nursery and food supply areas for all species. Lake Winnipeg as a whole is a highly productive area for commercial fishing and has the potential to be an important recreational fishery.

2. The Fisher River is an important spawning area for pickerel, pike and mullets.

3. Intermittent creeks along the Lake Winnipeg shoreline are important pickerel, pike and mullet spawning areas.

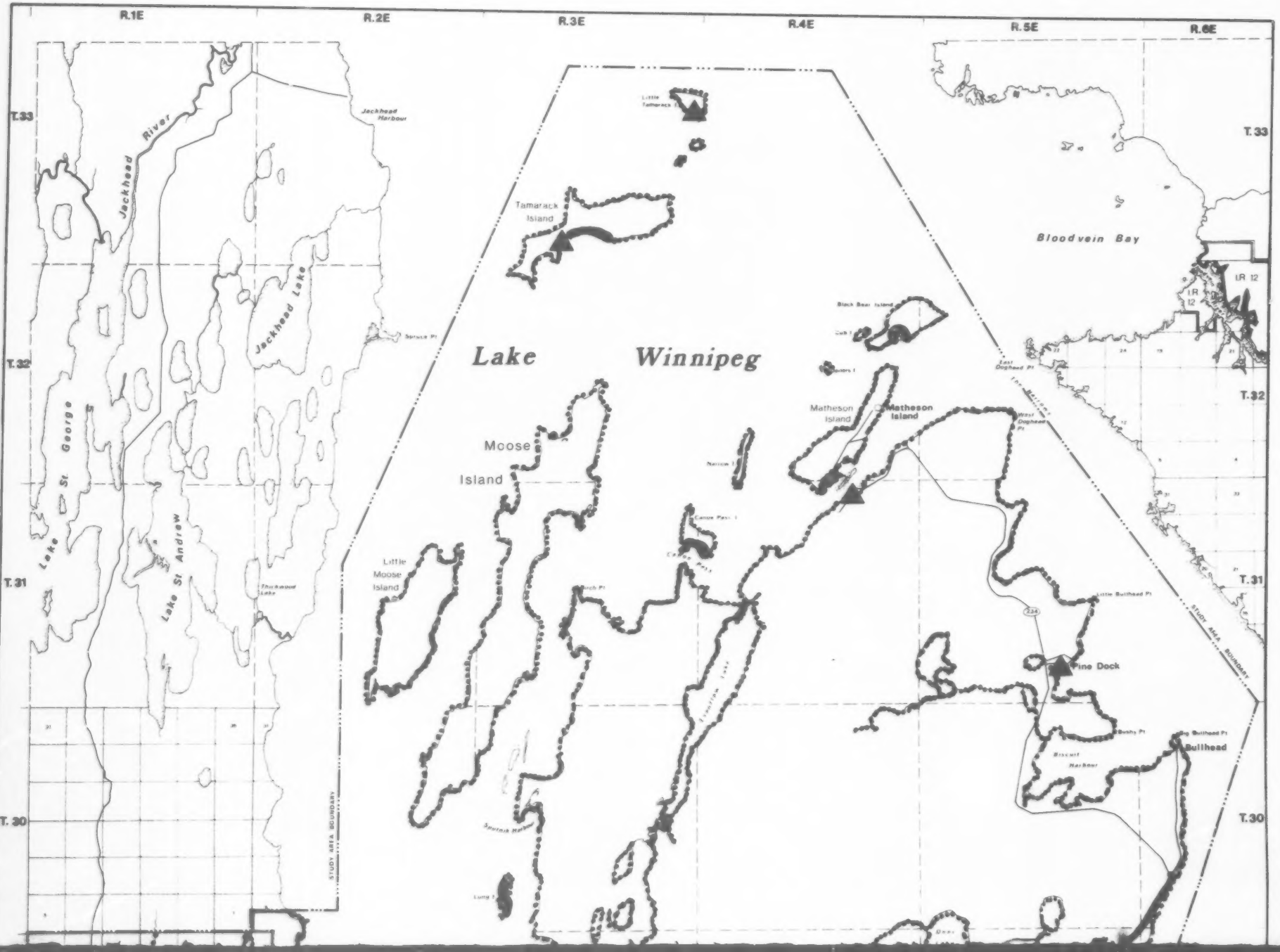
4. Moose, Deer and Goldeye Lakes are important pike and perch habitat.

5. Small unnamed lakes and ponds have potential for trout farming.

Buffers of vegetation are required along the shoreline of Lake Winnipeg and its islands, along the Fisher River, Beaver Creek, Moose Creek and other unnamed creeks that flow into Lake Winnipeg. Width of the buffers are specified in the Provincial Land Use Policies. Buffers are also required on Goldeye Lake, Moose Lake and Deer Lake. Small unnamed lakes should also be buffered as they have potential for trout farming.

## Rare and Endangered Fish Species

The Lake Sturgeon, which occurs in the study area is on the rare and endangered species list. The critical area for the species is the Matheson Island - Bloodvein Bay area of Lake Winnipeg. The existing shoreline vegetation and the quality of the water within the study area should be maintained to prevent loss of this species.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T.33
T.32
T.31
T. 30
Jackhead River
Jackhead Harbour
Jackhead Lake
Lake St George
Lake St Andrew
Thicketwood Lake
Spruce Pt
STUDY AREA BOUNDARY
Tamarack Island
Lake Winnipeg
Moose Island
Little Moose Island
Matheson Island
Bloodvein Bay
IR 12
Pine Dock
Bullhead
Bullhead Pt
Little Bullhead Pt
Busby Pt
Biscuit Harbour
Spurman Narrows
Canoe Pass
Canoe Pass I
Little Tamarack I
Black Bear Island
Sailors I
Narrow I
Lung I
Owen I
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West Dogheard Pt
The Narrows
Thicketwood Lake
STUDY AREA BOUNDARY
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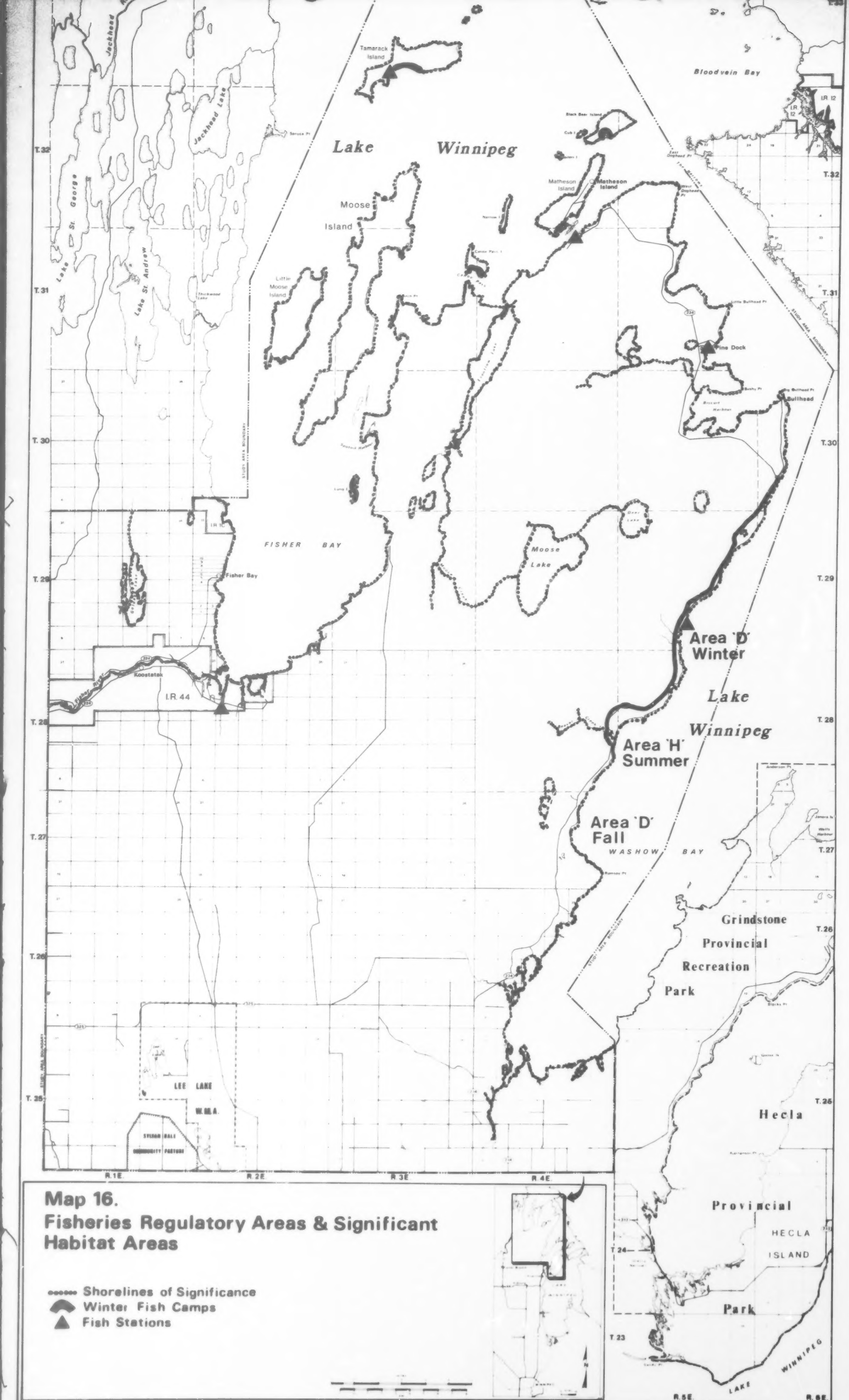


**Map 16.**
**Fisheries Regulatory Areas & Significant Habitat Areas**

- Shorelines of Significance
- Winter Fish Camps
- Fish Stations

## Fishery Investments

There is very little private investment in the fishery resource within the study area. Commercial fishermen have invested some money in their seasonal camps. The fish stations in the area are either owned by Co-op's or the Freshwater Fish Marketing Corporation. The existing fish stations are the Islandview (Matheson Island Co-op), Fisher River Co-op station at Fisher River (being replaced by Goodman's Landing), Frog Bay Station and the Pine Dock Station. Additionally there are 32 individual winter fish camps in the study area.

There are no lodges or cutcamps. One fish farmer is operating within the study area but his investment is minimal.

There is potential for investment in fishing lodges along P.R. 234. Investment in the trout farming industry is also a possibility. There are a number of small lakes on the west side of the study area that could be utilized for commercial rainbow trout farming.

## Access

Access to the fishery resource is provided by P.R. 234, P.R. 222 and resource extraction roads. Water access is also provided by boat traffic on Lake Winnipeg to major fish stations as well as to secondary camps. In general, the access to the fishery resource is adequate at the present time and it is unlikely that any extensive development of access will be required in the future.

## Demand

The demand for the fishery resource is high as communities in the study area are economically dependent on the commercial fishery.

The commercial demands on the fishery resource have increased tremendously in the past ten years. The overall quota on Lake Winnipeg has increased from 5 million kilograms to 6 million kilograms in that period of time. Prior to 1970 the overall quota has remained below 5 million kilograms. The demand on the resource from the commercial fishery will increase. Even in times of marketing difficulty and lower fish prices, demand for access to the resource and the demand for increased levels of harvest have remained high.

There is some domestic demand on the resource from residents of the lakeside communities.

The demand for recreational angling and other uses such as trout farming is low.

## Concerns and Issues

The outstanding potential concern is that the quality of water and the integrity of existing fisheries habitat be maintained, so that stocks of commercially valuable fish will continue to flourish.

Improper agricultural or forestry practices would lead to increased siltation of lakes and streams. Siltation as a result of increased drainage and land clearing has a detrimental effect on water quality and on fish habitat, particularly spawning habitat. Agricultural activity could also result in nutrient loading and enrichment of water from fertilizer applications. Harmful insecticides and herbicides could also be introduced. Herbicides and insecticides are also used in forestry management and the improper application of these chemicals could be detrimental to water quality.

Industrial activity could also degrade water quality.

At the present time the water quality and fisheries habitat in this area of Lake Winnipeg is in excellent condition. The outstanding issues at present revolve around various management practices rather than water quality or fisheries habitat issues.

# SECTION 4. FORESTRY

## Introduction

Manitoba's forests are a renewable and valuable resource required to sustain the forest industry, recreation, wildlife, fisheries, soil and watershed conservation needs. The natural forest ecology is increasingly subjected to the influence of human activities and an obligation exists to efficiently manage and protect forest lands to maintain and enhance the overall benefits occurring to the public of Manitoba.

In 1981 the value of shipments by Manitoba's forest products sector reached $476,000,000. This represented a ten year increase in value of over four fold. The value of shipments attributable to the logging component was over $50,000,000[1] in that year. The balance of $426,000,000[2] was created by the manufacturing components such as sawmills and pulp and paper mills. Together these components provided 5,100[2] man-years of direct employment and an estimated 5,000 man-years of indirect employment[3]. One job in 45 within the province is directly or indirectly dependent upon the forest industry.

Forest lands in Manitoba have been regarded in the past to be limitless. In the Manitoba Interlake Region, little attention has been paid to their conversion to land uses such as agriculture or transmission line and highway rights-of-way. The majority of forest land being withdrawn is on high quality sites where the same land may well provide high social returns from investment in intensive forestry.

The forest industry contributes significantly to the Interlake economy in the form of salaries, local employment and other economic benefits. Forest preservation and management also provides other substantial benefits to wildlife, fisheries, water and recreational resources. A continuous supply of forest fibre for wood using industries such as lumber and paper can be ensured by protecting and managing the forest land base.

## Timber Commitments and Future Demands

The plan area falls within the Abitibi Integrated Wood Supply Area #2 (IWSA-2), which was established as part of a timber supply area under the agreement between Manitoba and Abitibi-Price Inc. The agreement is covered by Order-in-Council No. 519 dated May 23, 1979. The wood supply is managed by the Department of Natural Resources with Abitibi-Price having first right of refusal to the spruce and balsam harvested from Crown land. This means Abitibi-Price has the first right to purchase spruce and balsam produced at market competitive prices or the first right to install their own harvesting operations in the area.

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1 Department of Natural Resources, Annual Report

2 Statistics Canada

3 Multiplier is 2.0. See "The Forest Industry in the Economy of Ontario" (Toronto, Ministry of Natural Resources, 1981) for further details.

Abitibi-Price Inc. has harvested and/or purchased 141,663.33$m^3$ (56,665.33 cords) of pulpwood from IWSA #2 during the years 1972-73 to 1981-82. Of the above total, 36,385.33$m^3$ (14,554.13 cords) were obtained from the study area. Annual purchase and/or harvest of pulpwood by Abitibi-Price Inc. from IWSA #2 has ranged from a low of 10,470.83$m^3$ (4,188.33 cords) in 1972-73 to a high of 31,281.53$m^3$ (12,512.61 cords) in 1981-82. It is anticipated that 37,500$m^3$ (15,000 cords) of pulpwood will be purchased by Abitibi-Price in 1983-84 (Appendix 4).

The importance of IWSA #2 has become even more important during the past several years to Abitibi-Price Inc. due to the following:

a) Large area allocations in critical timber supply areas of productive forested land to other uses where such allocations exclude timber harvesting.

b) The 1980 and 1983 fire seasons on the east side of Lake Winnipeg have reduced the volumes of softwoods available for timber harvesting.

A shortage of softwood existed in the plan area resulting from the 1977 Riverton burn. This fire precipitated the reduction of the annual allowable cut (AAC) of softwoods. With the subsequent reduction of allowable cut, eight timber allocation holders were relocated to an adjoining forest management area where a surplus existed. This relocation allowed six timber allocation holders and two communities to remain in the area and harvest the same volumes of softwoods as before the fire (Map 17 and Appendix 5).

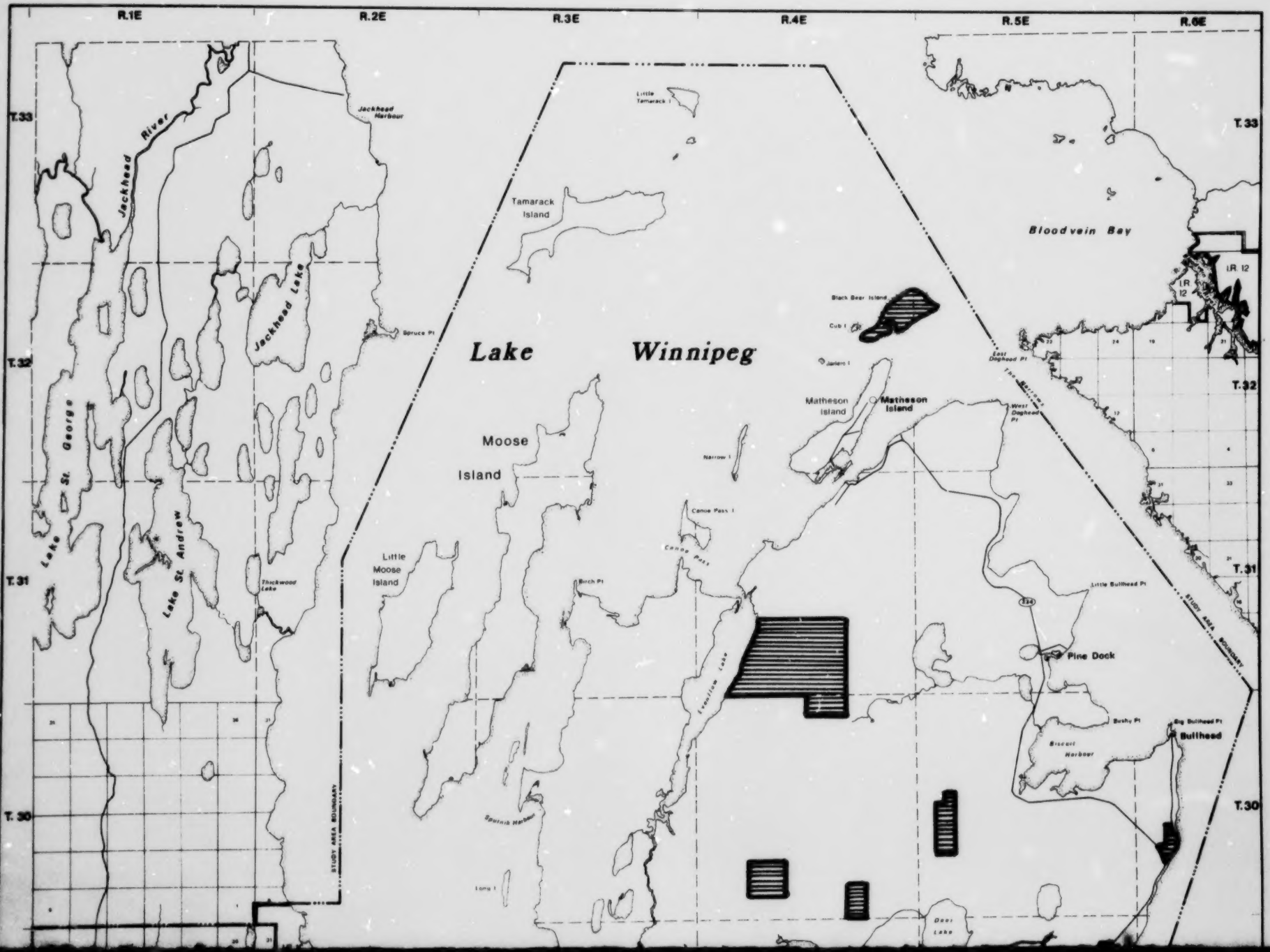
The Province has a commitment to the timber allocation holders and communities to provide them with areas of merchantable timber where they can annually harvest approximately 10,000$m^3$ (4,000 cords) and 1,500$m^3$ (600 cords) of softwoods and hardwoods respectfully.

The AAC for the area will be recalculated after 20 and 40 years and will most likely be increased as long as the burn area has been restocked naturally and/or artificially.

There are three tree plantations within the study area for which public money has been spent and therefore the public investment needs to be protected and managed for long term forestry use. The location description for the plantations are as follows:

Plantation #1 - Sections 9 & 16 of Twp. 29, Rge. 5 EPM
Plantation #2 - Section 12 of Twp. 26, Rge. 2 EPM
Plantation #3 - Sections 16, 21, 28 of Twp. 25, Rge. 2 EPM

Based on past trends and economic growth predictions, this area of the Province should experience a greater level of demand for forest products and subsequently industrial growth than the Provincial average of between 2-3 percent annually. In addition, the study area because of its proximity to markets and available surplus of softwood and hardwood, geographically capable of providing a substantial opportunity for the establishment of forest using industries.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Jackhead River
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Lake St. George
Lake St. Andrew
Thickwood Lake
Spruce Pt
STUDY AREA BOUNDARY
Little Tamarack I
Tamarack Island
Lake Winnipeg
Black Bear Island
Cub I
Matheson Island
Matheson Island
Moose Island
Narrow I
Canoe Pass I
Canoe Pass
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Birch Pt
Swallow Lake
Spirtish Harbour
Long I
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Biscuit Harbour
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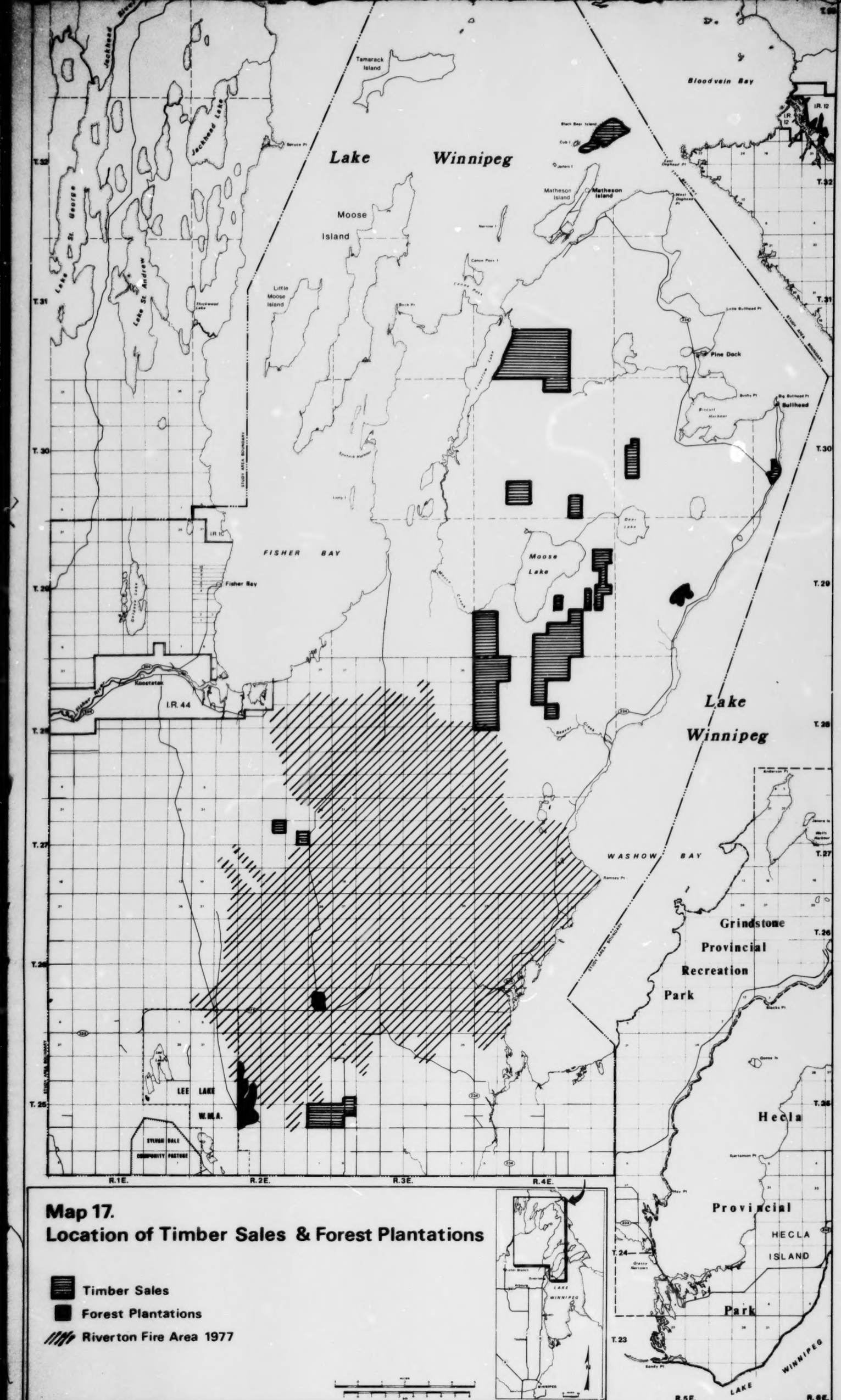



## Map 17.
## Location of Timber Sales & Forest Plantations

- Timber Sales
- Forest Plantations
- Riverton Fire Area 1977

## Volume Summary and Forest Land Use Capability

According to the 1976 Forestry Inventory (Becker 1978), almost 50 percent of the total forested land is considered to be productive for the harvesting of forest products. Within the area of interest for forestry consideration (Map 18) approximately 3.2 million cubic meters of gross merchantable timber exist within cutting classes 3-5 (Table 12, Map 19 and Appendix 6).

Approximately 52 percent of the forest resource is softwoods, predominantly black spruce, balsam fir and white spruce. Trembling aspen constitutes about 77 percent of the remaining hardwood resource (Map 20).

For this same area, utilizing Class 3, 4 and 5 forestry capability lands, approximately 202,000$m^3$ of softwoods can be grown per year (Map 21, Table 13 and Appendix 7). It is noted that there are no Class 1 or 2 CLI forest capability lands in Manitoba.

Table 12. Gross and net merchantable volumes, cutting Classes 3-5 in cubic meters[1]

| Species | Gross Volume | Net Volume |
|---|---|---|
| Softwood Total | 1,692,760 | 1,465,380 |
| Hardwood Total | 1,557,170 | 939,630 |
| Total Softwood & Hardwood | 3,249,930 | 2,405,010 |

1. Cutting class is based on size, vigour, state of development and maturity of a stand for harvesting purposes.
   Class 3 - Immature stands with merchantable volume growing at or near their maximum rate and should not be cut.
   Class 4 - Mature stands which may be cut as they have reached rotation age.
   Class 5 - Overmature stands, which should be given priority in cutting.

Net merchantable volume is the volume of all species with diameter 9.1 cm at breast height and larger less the respective cull factors.

Timber volumes burned due to the 1977 Riverton fire are excluded from the gross and net merchantable figures.

Map 18 indicates area for which volume figures have been calculated.

Table 13. Canada Land Inventory for Forestry[1]

| CLI Capability Classification[2] | Area Hectares | Volume Cubic Meters/Year[3] |
|---|---|---|
| Class 3 | 2,108 | 12,015.6 |
| Class 4 | 23,714 | 101,970.2 |
| Class 5 | 30,306 | 87,887.4 |
| Class 6 | 7,800 | 11,700.0 |
| Class 7 | 70,655 | 56,524.0 |

1. These capability figures represent the estimated growth of softwood tree species, expressed in ranges of gross merchantable volume increment per land unit per year. The figures were obtained from measurements of the best observed stands and individual trees on each particular soil series within the map area or in the immediate vicinity.

2. Capability is defined as the gross mean annual increment of merchantable volume, where:

| | | | |
|---|---|---|---|
| Class 3 | 5.0 - 6.3 $m^3$/ha/year | Class 4 | 3.6 - 4.9 $m^3$/ha/year |
| Class 5 | 2.2 - 3.5 $m^3$/ha/year | Class 6 | 0.8 - 2.9 $m^3$/ha/year |
| Class 7 | 0.0 - 0.8 $m^3$/ha/year | | |

3. Volume figures are based on:

| | | | |
|---|---|---|---|
| Class 3 | 5.7 $m^3$/ha/year | Class 4 | 4.3 $m^3$/ha/year |
| Class 5 | 2.9 $m^3$/ha/year | Class 6 | 1.5 $m^3$/ha/year |
| Class 7 | 0.8 $m^3$/ha/year | | |

Note: There are no Class 1 or 2 forest lands found in Manitoba

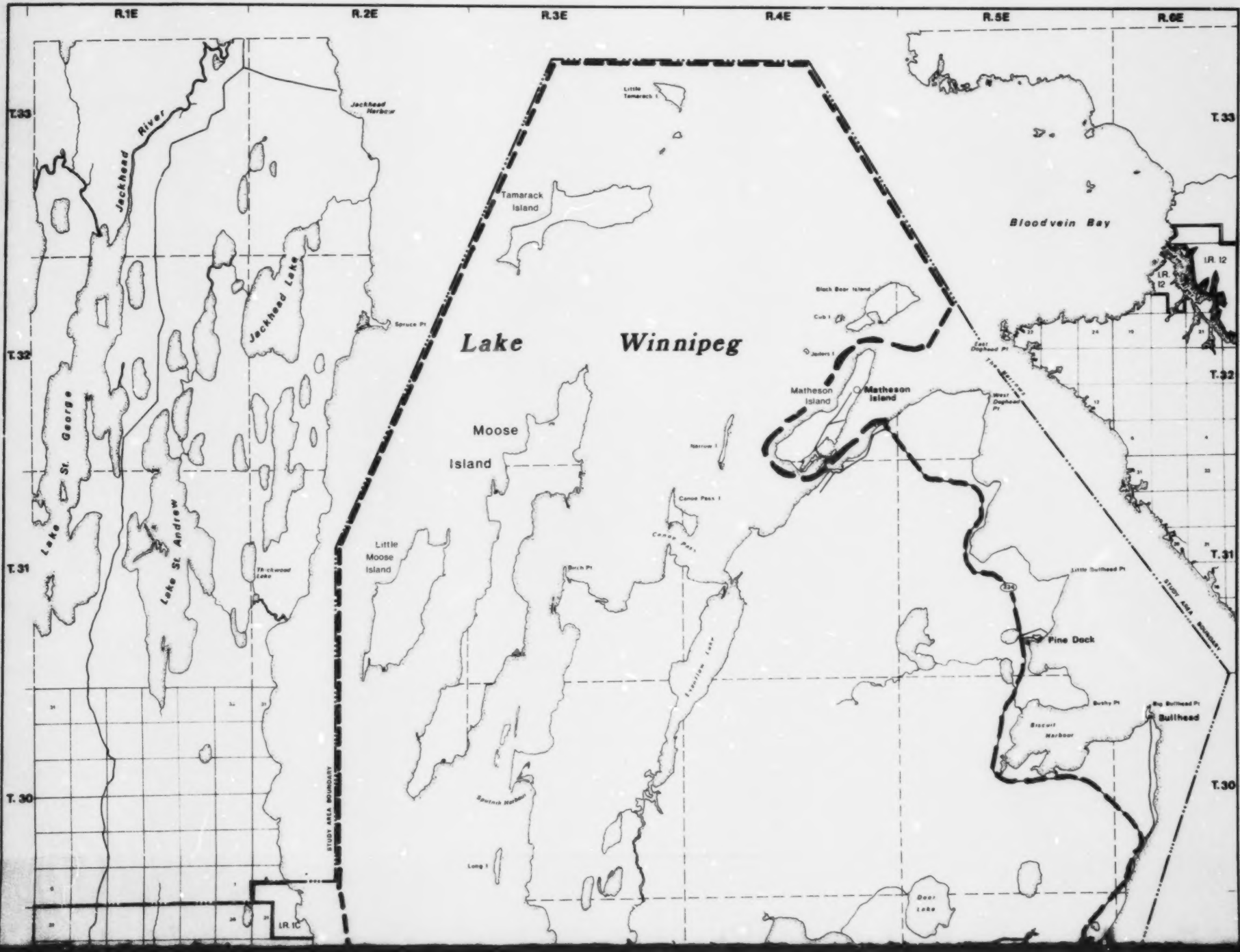
## Annual Allowable Cut

Approximately 85 percent of all productive forested lands within Manitoba are administered by the Province. To administer such a vast area, the forested zone has been divided into 58 areas called Forest Management Units (FMU's), Map 22. The study area is located in FMU 40. Within each FMU, the timber resource is managed in accordance with sustained yield management principles. This requires the forest to be managed in a manner which maintains a balance between the forest's ability to replenish itself and commercial harvesting along with natural depletion.

As a result of the sustained yield management principle, annual allowable cut (AAC) volumes have been established for each FMU.

The allowable annual cut (AAC) is defined as the average volume that may be harvested yearly from a given forest unit and sustained continuously throughout the length of the rotation. Information on capability, volume, species, increments and rotations are all utilized in the estimation of AAC's, (Appendix 8).

Map 18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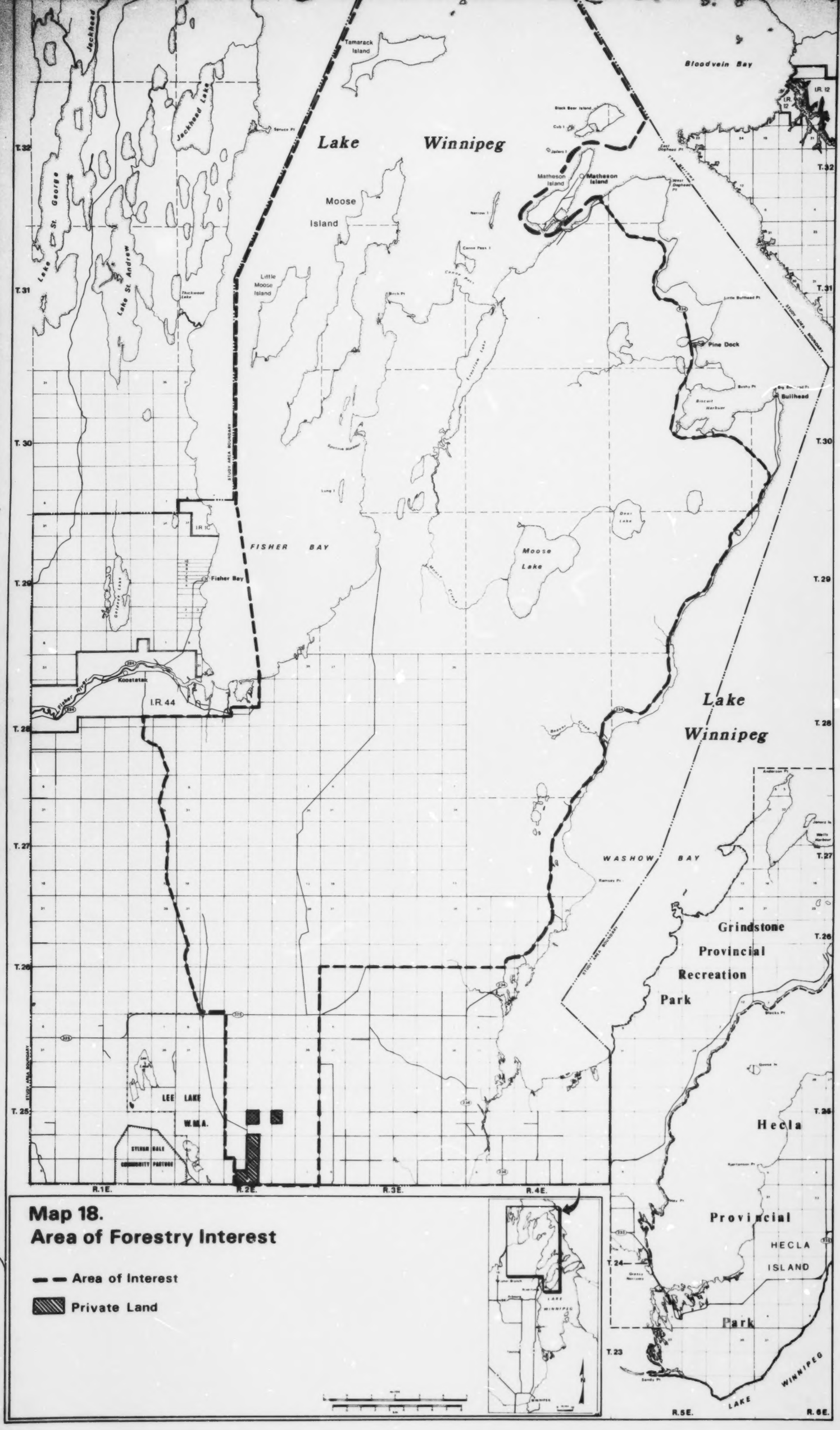
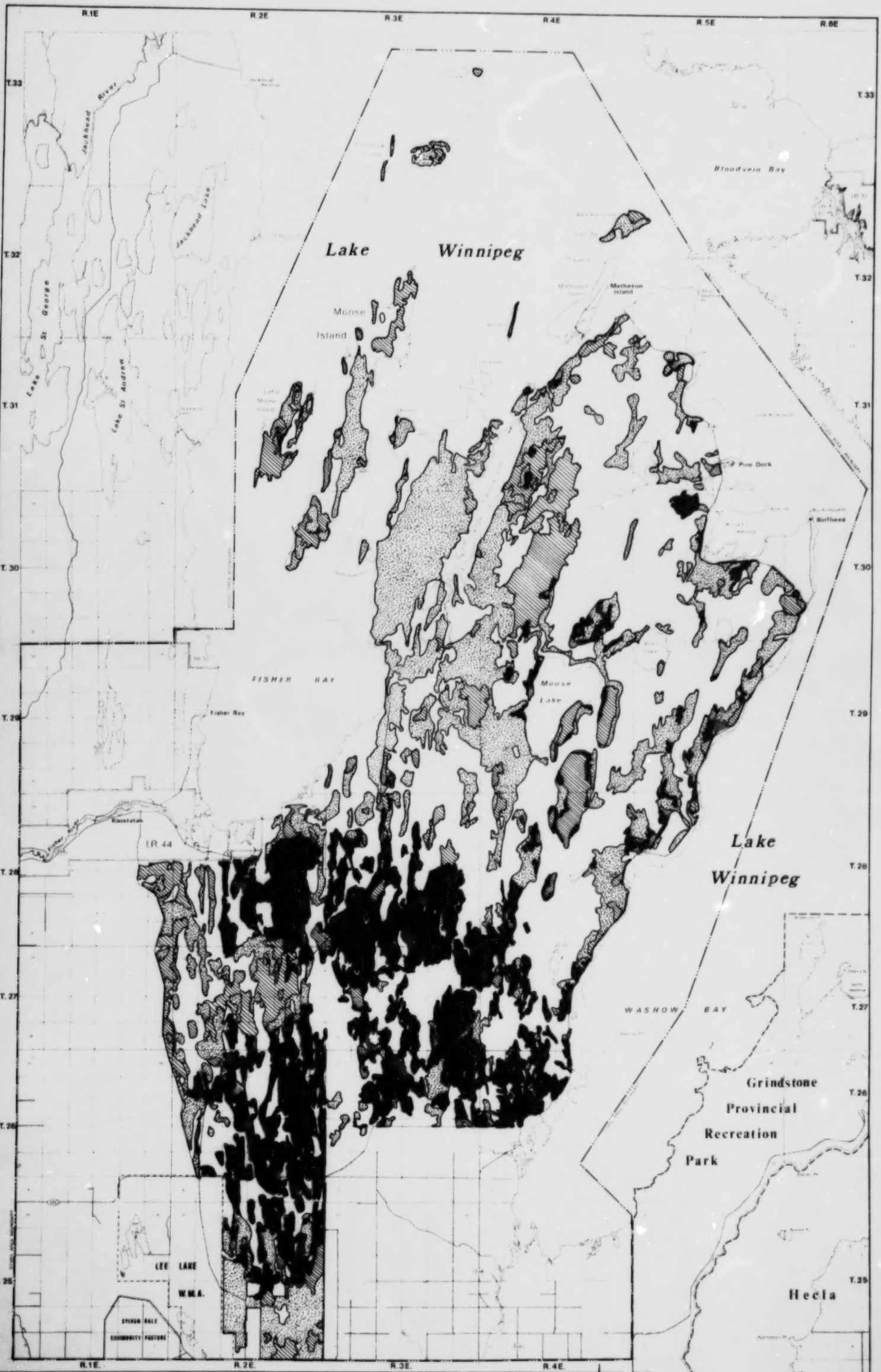
Lake St George
Lake St Andrew
Thickwood Lake
STUDY AREA BOUNDARY
I.R. 1C
Little Tamarack I
Tamarack Island
Lake Winnipeg
Moose Island
Little Moose Island
Black Bear Island
Cub I
Jackers I
Narrow I
Canoe Pass I
Canoe Pass
Birch Pt
Swanlow Lake
Spurnch Harbour
Long I
Door Lake
Matheson Island
Matheson Island
East Dogheard Pt
West Dogheard Pt
Fish Hatchery
Bloodvein Bay
I.R. 12
I.R. 12
Little Bullhead Pt
Pine Dock
Bushy Pt
Big Bullhead Pt
Bullhead
Biscuit Harbour
STUDY AREA BOUNDARY




## Map 18.
## Area of Forestry Interest

— — Area of Interest

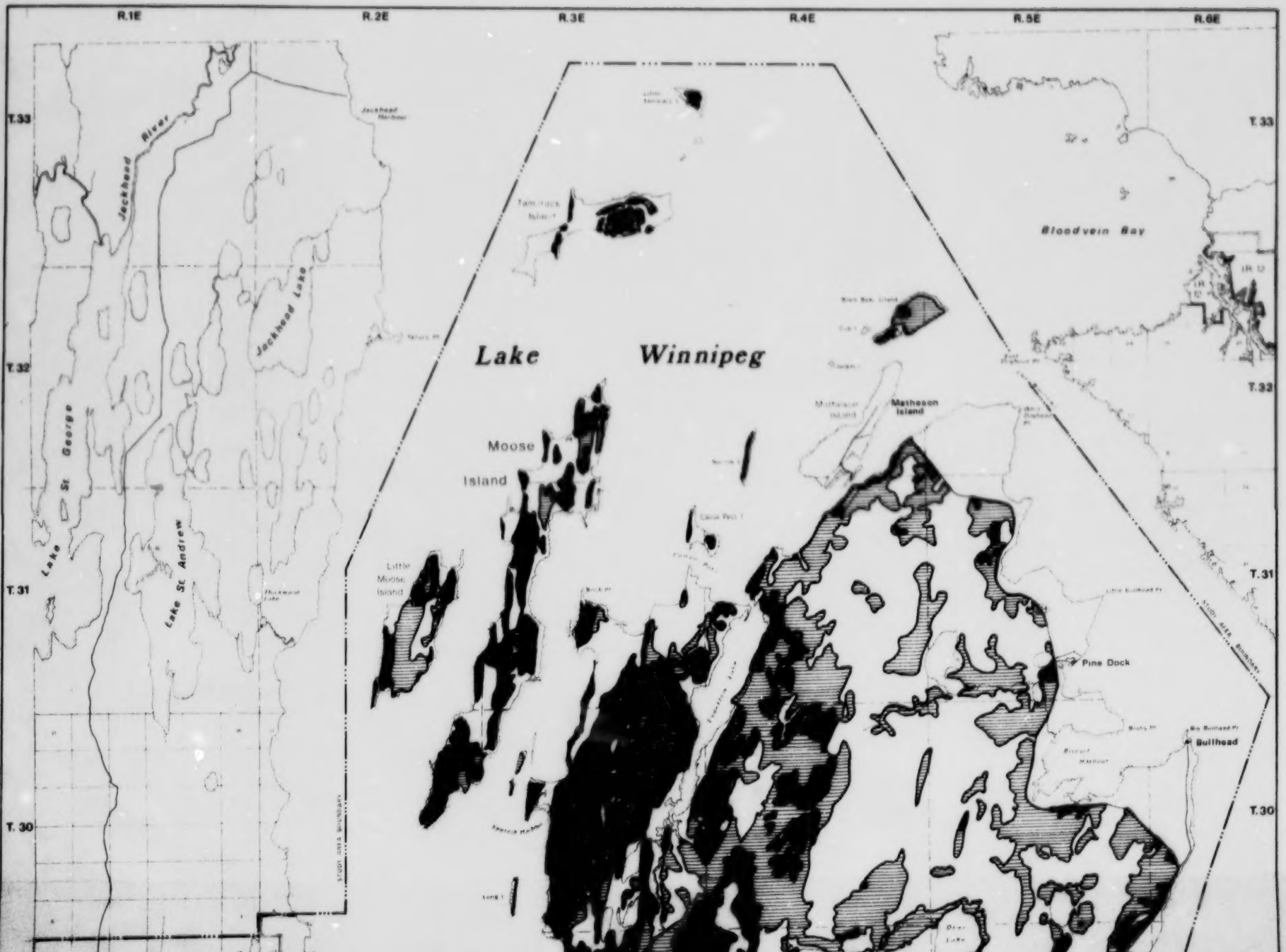
▨ Private Land

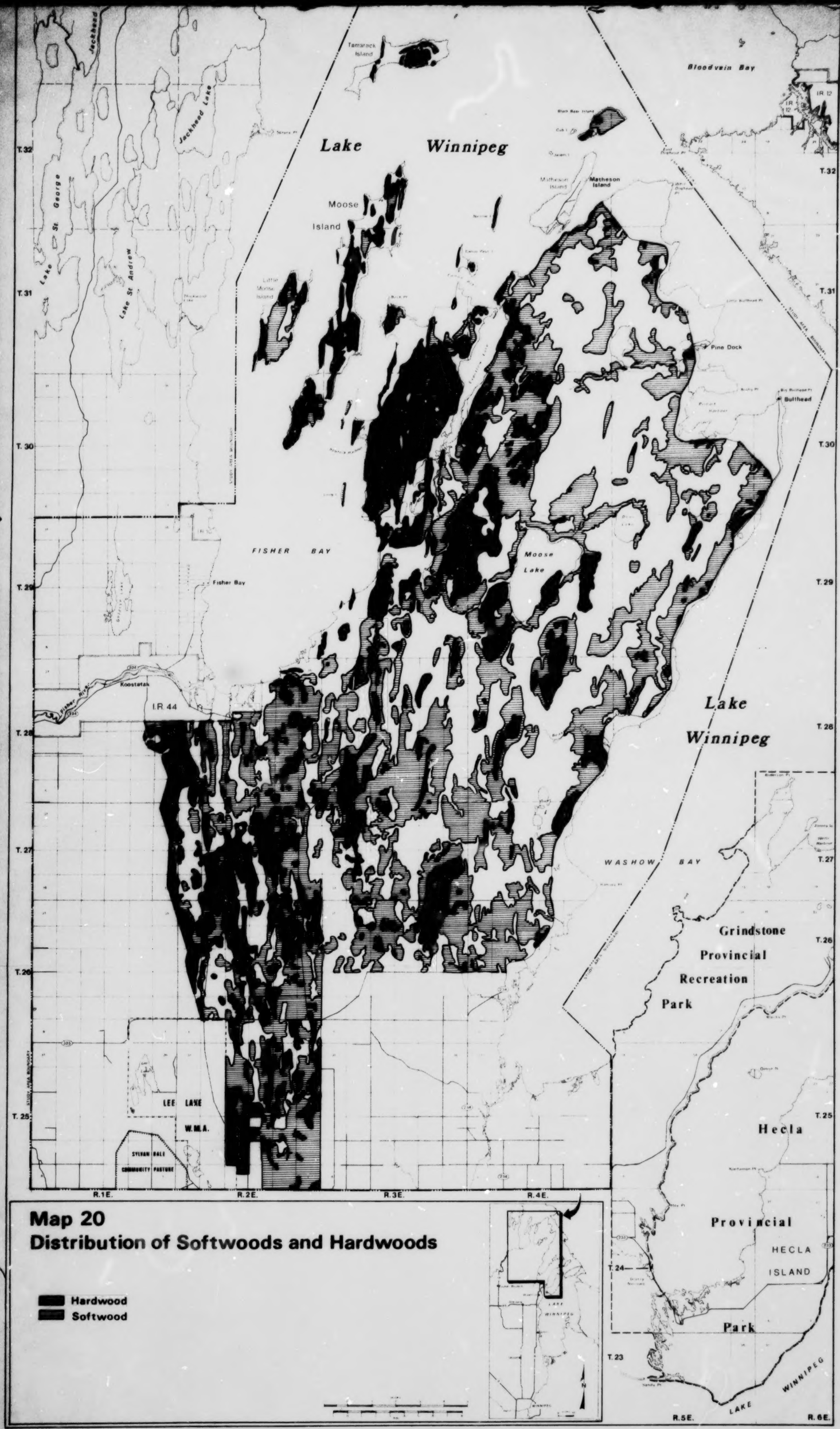



**Map 19.**
**Forestry Cutting Classes**

# Map 19.
# Forestry Cutting Classes

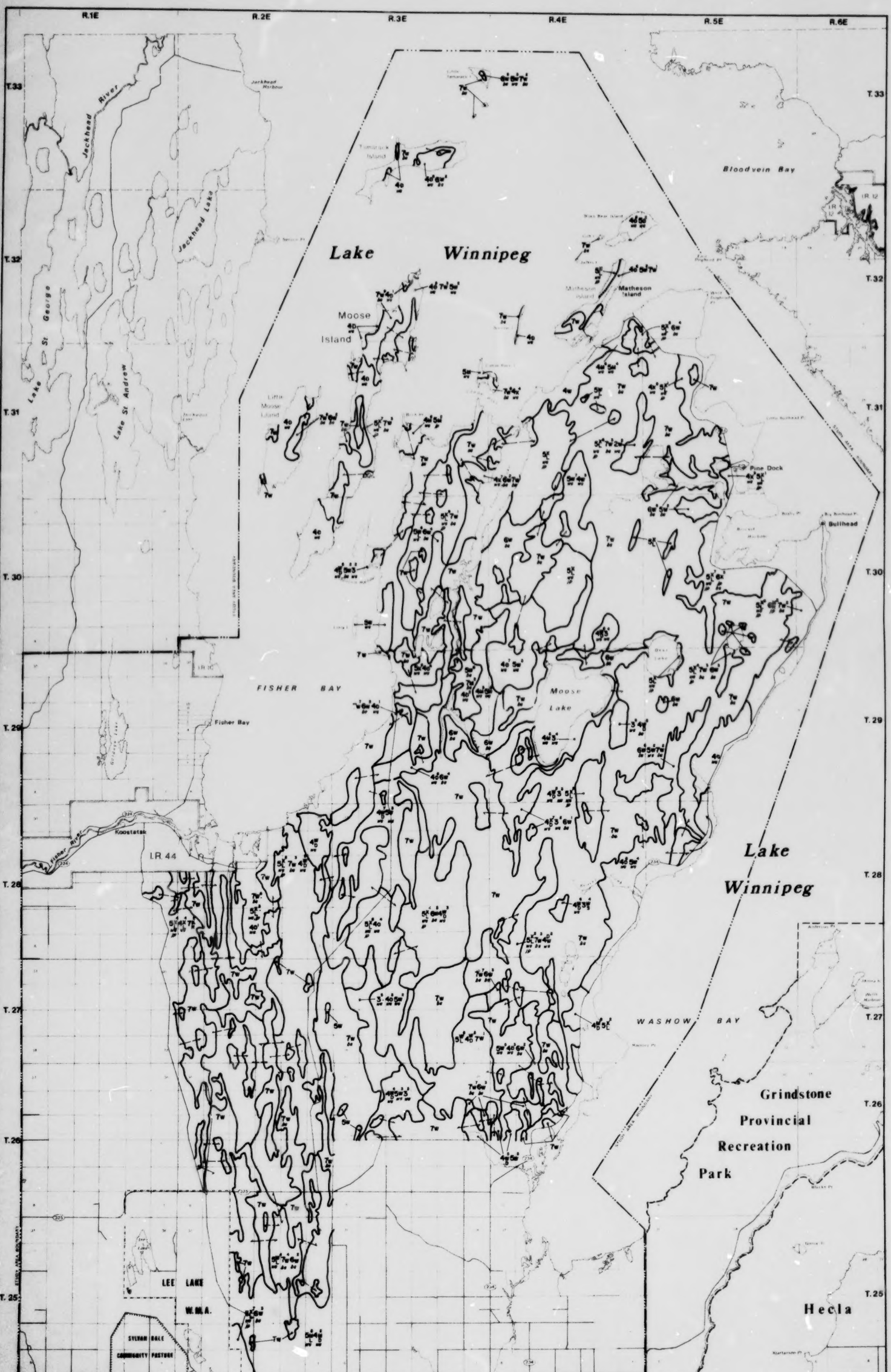
- 0 ..... Potentially Productive
- 1, 2, 3 ..... Immature
- 4, 5 ..... Mature and Overmature


R.1E
R.2E
R.3E
R.4E
R.5E
R.6E
T.33
T.32
T.31
T. 30
Jackhead River
Jackhead Lake
Lake St George
Lake St Andrew
Jackhead Harbour
Lake Winnipeg
Matheson Island
Moose Island
Little Moose Island
Bloodvein Bay
IR 12
Pine Dock
Bullhead
STUDY AREA BOUNDARY

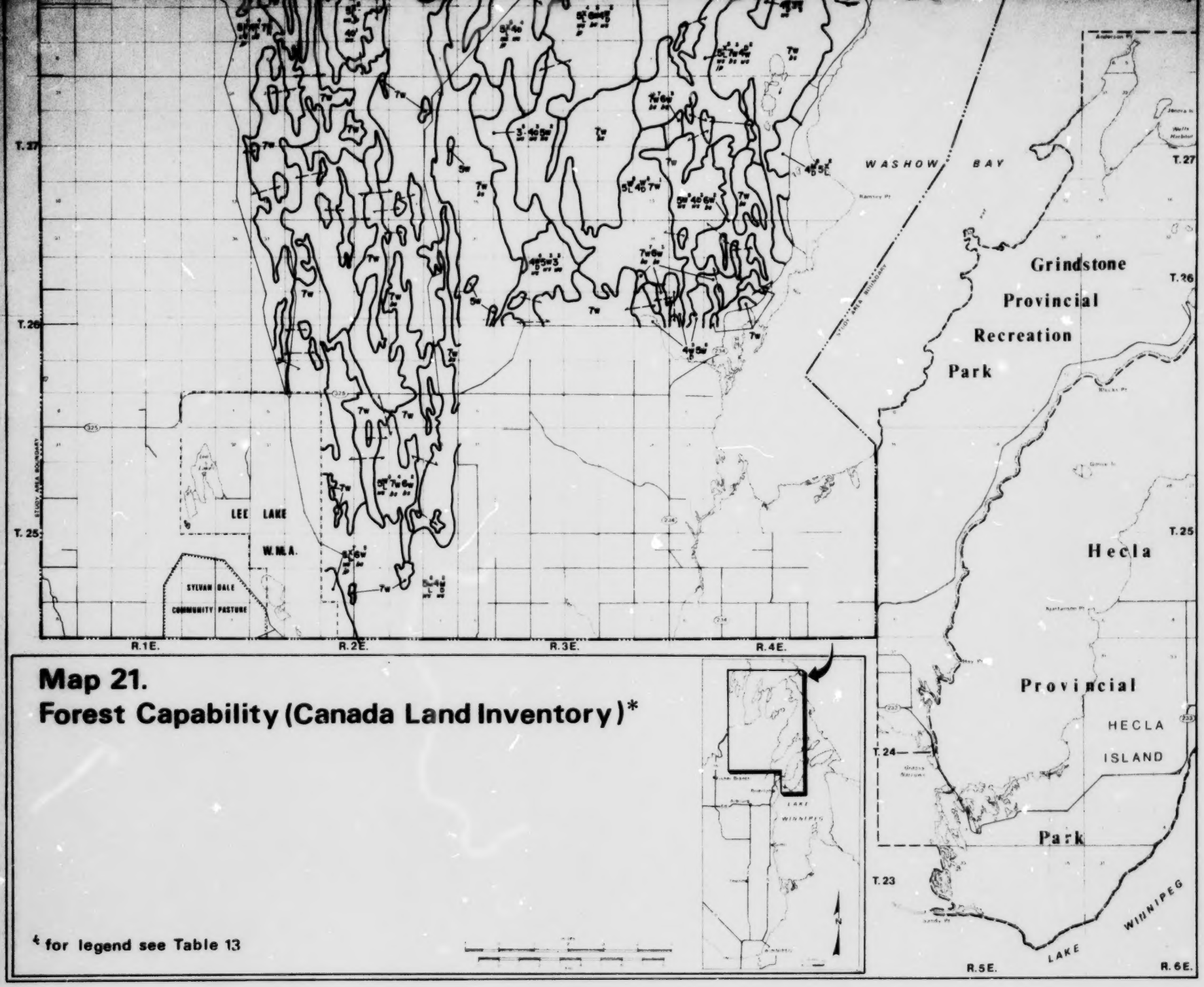



**Map 20**
**Distribution of Softwoods and Hardwoods**

Hardwood
Softwood

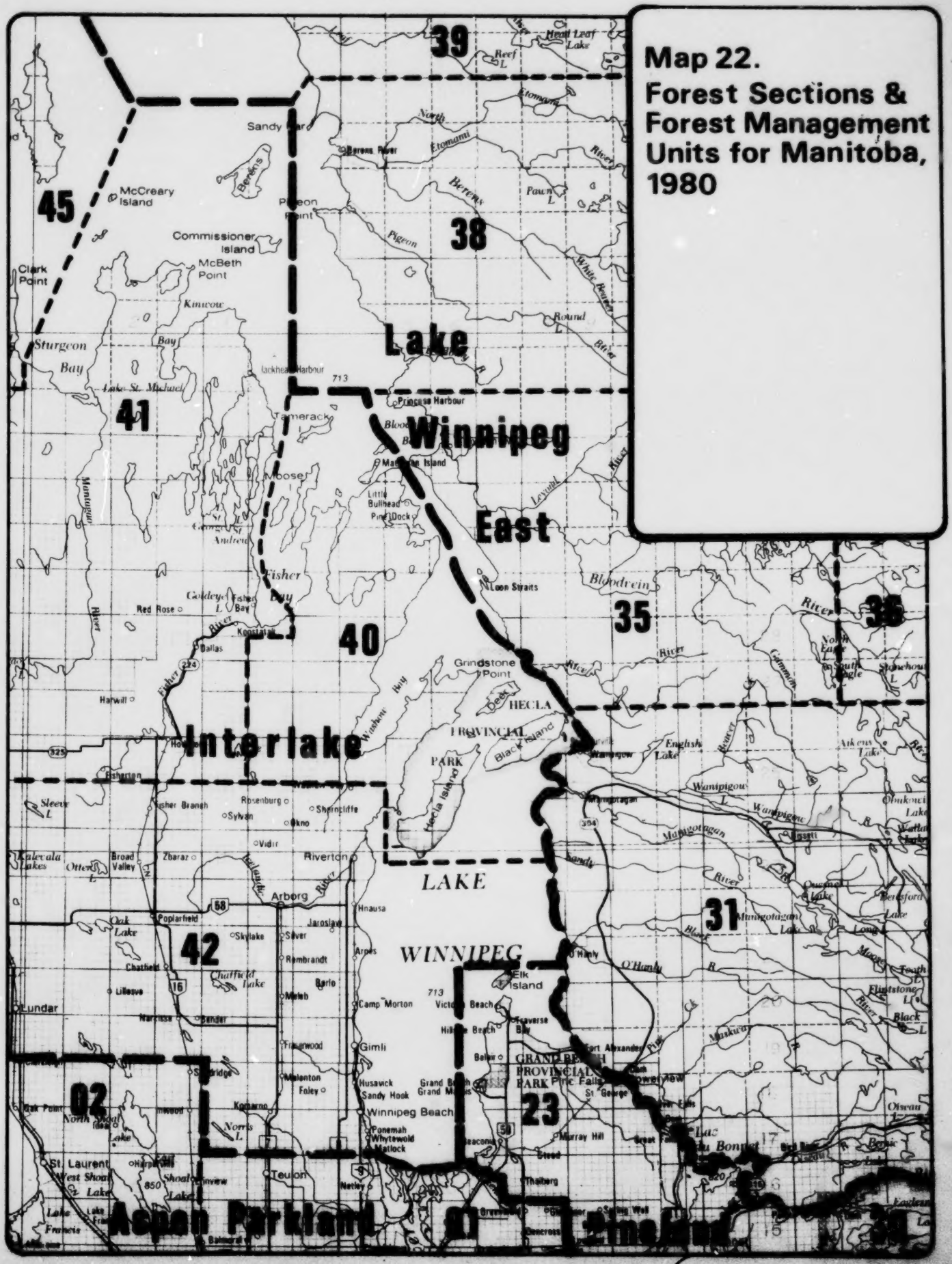



**Map 21.**
**Forest Capability (Canada Land Inventory)***




# Map 21.
# Forest Capability (Canada Land Inventory)*

[4] for legend see Table 13




# Map 22.
# Forest Sections & Forest Management Units for Manitoba, 1980

Due to the economic feasibility under present conditions of extraction, conversion and marketing, restrictions are imposed upon the forest stands that may be considered for inclusion in annual allowable cut calculations. In Manitoba, there are currently three such levels of restrictions, referred to as practical annual allowable cuts, Table 14.

Table 14. Forest management unit 40, practical annual allowable cuts by diameter groups and species in cubic meters (Becker 1978).

| | Diameter Group - Volumes $m^3$ | | | | |
|---|---|---|---|---|---|
| | 12 cm | 14-18 cm | 20-24 cm | 26 cm+ | Total |
| First Practical AAC[1] | | | | | |
| Total softwoods | 2,540 | 8,050 | 4,590 | 1,230 | 16,410 |
| Second Practical AAC | | | | | |
| Total softwoods | 4,120 | 14,700 | 8,260 | 4,240 | 31,320 |
| Total hardwoods | 1,260 | 9,510 | 9,530 | 7,680 | 27,980 |
| Total | 5,380 | 24,210 | 17,790 | 11,920 | 59,300 |
| Third Practical AAC | | | | | |
| Total softwoods | 4,790 | 16,780 | 9,590 | 5,560 | 36,720 |
| Total hardwoods | 1,420 | 10,220 | 10,330 | 8,940 | 30,910 |
| Total | 6,210 | 27,000 | 19,920 | 14,500 | 67,630 |

1. Excluding tamarack larch and hardwood species

The first practical AAC figures relate only to stands in the jack pine, black spruce, white spruce and balsam fir working groups which have a volume of 55 cubic meters per hectare and over. All hardwood stands and all stands of softwood with a lesser volume are excluded.

The second practical AAC figures differ only from the first practical AAC in that stands of trembling aspen with volumes of at least 55 cubic meters per hectare are also included in the area and volume base.

The third practical AAC differs from the other levels in that all softwood timber stands with a volume of 25 cubic meters per hectare or over and all hardwood stands with a volume of 40 cubic meters per hectare and over are included in the area and volume base. This level is considered to be the optimum that can be achieved under realistically intense utilization of the forest base.

Currently, FMU 40 is managed at the first Practical AAC volume level of 16,410 $m^3$. The third level AAC volume of 67,630 $m^3$ will be obtainable in the near future as utilization practices, demand and price for forest products improve.

The 1977 Riverton Fire destroyed vast quantities of merchantable timber subsequently reducing the AAC within the study area. The AAC will be recalculated after 20 and 40 years and will most likely be increased as long as the burn area has been restocked naturally and/or artificially.

To sustain in perpetuity the annual allowable cuts described then the land base must be maintained for forest management purposes. If the land base is reduced, then the AAC will be reduced accordingly (Appendix 9).

Any reduction in the AAC due to land withdrawal from forestry use could jeopardize future potential for the expansion of existing forest industy and/or the establishment of new forest using industries within the Interlake Region.

## Present Economic Benefits

The economic benefits presented below are measured in terms of the forest industries' impact upon the province's gross provincial product. Unit values for pulpwood, logs and bolts and other products were adjusted for inflation and averaged over a five year period (1977 to 1981). This average was then converted to 1983 dollars on the assumption that inflation during 1983 would average six percent. The derived unit values were $14.50 per cubic meter for logging and $42 per cubic meter for the primary manufacturing sector. Product composition was also assumed to approximate provincial averages.

Harvest levels during 1980/81 were approximately 5,000 cubic meters, well below the area's total potenital. Based on the provincial average values stated above, the area contributed $283,000 to Manitoba's gross provincial product in that year.

The study area is within what could be referred to as Manitoba's commercially forested area. This is the area which according to Forestal International Ltd. (1982), will be required to sustain forest industry growth until the turn of the century. In this context, using the highest utilization of the AAC, the economic contribution would be in excess of $3,820,000 per year. It should be noted that these benefits include both the logging and primary manufacturing values.

## Potential Economic Importance of the Washow-Fisher Peninsula[1]

The timber resources of the Washow-Fisher peninsula have the potential to support the development of a significant forest industry. With respect to forest management and renewal, many new jobs would be created for local residents in the form of tree planting, stand tending, etc., in an effort to maintain the forest resource as it is harvested as well as to enhance it. Any allocation of these lands which would preclude future timber harvests on a sustained yield basis would affect the Interlake's forest industry.

As previously described the timber resources of the Province are managed in accordance with sustained yield management principles. Thus, the forest is managed to maintain a balance between commercial and natural depletion, with the forest's ability to replenish itself. The forest's total growth rate less natural losses then becomes the maximum potential commercial harvest which is consistent with sustained yield management. This maximum potential harvest is based upon biological criteria and serves as the basis for calculating the more practical management guideline which is known as the annual allowable cut (i.e., AAC).

[1] Personal Communication: L. Gravelines typescript reports, October 28, 1983 and April 11, 1984. Economic Importance of Washow-Fisher Peninsula to Manitoba's Forest Industry.

The AAC measures the proportion of the sustainable yield which can be harvested as roundwood and processed into higher valued products by the primary manufacturing industries. This proportion depends upon the technological and economic limitations associated with the harvesting and manufacturing sectors and will vary as these limitations change over time. In this way the purely biological calculation of the sustainable yield is adjusted to recognize the real constraints imposed upon the forest industry.

If a large area of productive forested lands is made inaccessible to the forest industry then that area must be excluded from the calculations which result in the AAC for that region. Failure to make this adjustment would mean that the allowable harvest in the balance of the region could not be sustained by forest growth in that area. The result would be over harvesting with the possible destruction of the forest resources in the area.

Allocation of the forest resources of the Washow-Fisher peninsula to uses not compatible with sustained yield management would require a reduction of the AAC for the region. The reduced industrial supply is a reduction in total potential economic activity.

For the practical purposes of implementing sustained yield management, the AAC is calculated under a number of utilization assumptions. Differences between utilization assumptions reflect different outlooks for technological and economic constraints affecting the area's industry. The three versions of AAC which are presently calculated are called Net Operable (Net Op) levels (also Practical AAC). Net Op I calculations contain the most conservative assumptions; Net Op III calculations assume a more technologically upgraded industry. All three levels are used in Manitoba for practical forest management (Table 14 and 15). As detailed, the existing industrial timber supply ranges from a low of 16,410 cubic meters ($m^3$) under Net Op I calculations to a high of 67,630 cubic meters ($m^3$) on a Net Op III basis.

Table 15. Annual Timber Supply Estimates for the Washow-Fisher Peninsula[1]

| AAC Basis | Volume in Cubic Meters | | |
|---|---|---|---|
| | Softwoods | Hardwoods | Total |
| Net Op I | 16,410 | - | 16,410 |
| Net Op II | 31,320 | 27,980 | 59,300 |
| Net Op III | 36,720 | 30,910 | 67,630 |

1. Also see Table 14

A potential timber harvest of between 16,410 cubic meters and 67,630 cubic meters would affect a number of important economic indicators. This potential increase in the area's timber harvest would specifically affect (a) industry sales as measured by the gross value of shipments, (b) the gross provincial product, (c) the value of taxes flowing to the provincial treasury and (d) employment opportunities. If these effects were realized immediately, then the value of these indicators are summarized in Table 16 (Appendix 11).

Table 16. Annual Estimated Economic Potential of the Forest Resources of Washow-Fisher Peninsula

| ECONOMIC INDICATORS | ACTUAL 1980/81 HARVEST ($5.000m^3$) | (VALUE IN THOUSANDS OF 1983 DOLLARS) Low Net Op I | High Net Op III |
|---|---|---|---|
| Gross Value of Shipments | 667.3 | 2,190.1 | 9,025.9 |
| Gross Provincial Product | 282.5 | 927.1 | 3,821.1 |
| Provincial Government Receipt | 28.3 | 92.7 | 382.1 |
| Employment (Man Years) | 6 | 20 | 83 |

The extent to which these potential values can be realized, will depend upon the adequacy of Manitoba's future supply of timber to meet the industrial demand for timber. The Washow-Fisher Peninsula lies within what could be referred to as Manitoba's commercially forested area. This is the area which is required to sustain forestry industry growth until the turn of the century. Forestal International Limited (1982) found that timber outside of this area was simply inaccessible due to the high cost of road construction. As such, it was concluded that the inaccessible timber would not be used until the next century.

It is assumed that any reallocation of the area will affect the forest industry not later than the year 2000 A.D. This is the latest year by which forest development is expected to occur in this area (Forestal International Ltd. 1982). Therefore this assumption leads to a conservative estimate as to when these potential benefits would, in fact, be realized. Besides the above noted economic indicators, it should be noted that the timber supply in the study area would benefit local logging companies and individual communities. These benefits would be in the form of lower than anticipated logging costs for companies and increased employment opportunities for surrounding communities.

Using the conservative assumption that the timber in the study area would not be utilized until 2000 A.D., then the capitalized economic values of the forest resources are as follows:

| | |
|---|---|
| Gross Value of Shipments: | $36,689,000 |
| Gross Provincial Product: | 15,532,000 |
| Provincial Receipts: | 1,553,000 |
| Employment: | 45 man years |

## Concerns and Issues

In 1982, a 20 year forest management plan was completed for the Province of Manitoba. The plan assessed the 10 forest sections of Manitoba but addressed in more specific terms the six forest sections currently being harvested. The plan also dealt primarily with softwood on the six sections as these are the majority species harvested and used in Manitoba. With improved technology and increased wood fibre demand, hardwood will become more important in the future than now. The Washow-Fisher land use study area is part of the Interlake Section, and of the six sections analyzed.

The plan concluded that the demands for forest resources are pushing the renewal capacity to the limit and action must be taken now to prevent serious deterioration of the forest industry in Manitoba.

Based on regeneration surveys carried out five years following harvest, it was found that since 1965 a substantial portion of the cutover area has not regenerated (Graph 1). This meant that:

1. In 10 years time, 70,400 hectares (174,000 acres) will have been taken out of timber production. Land alienation from forestry use will further compound this problem.

2. The present level of harvest on the six accessible forest sections being harvested and the dependent industry cannot be sustained.

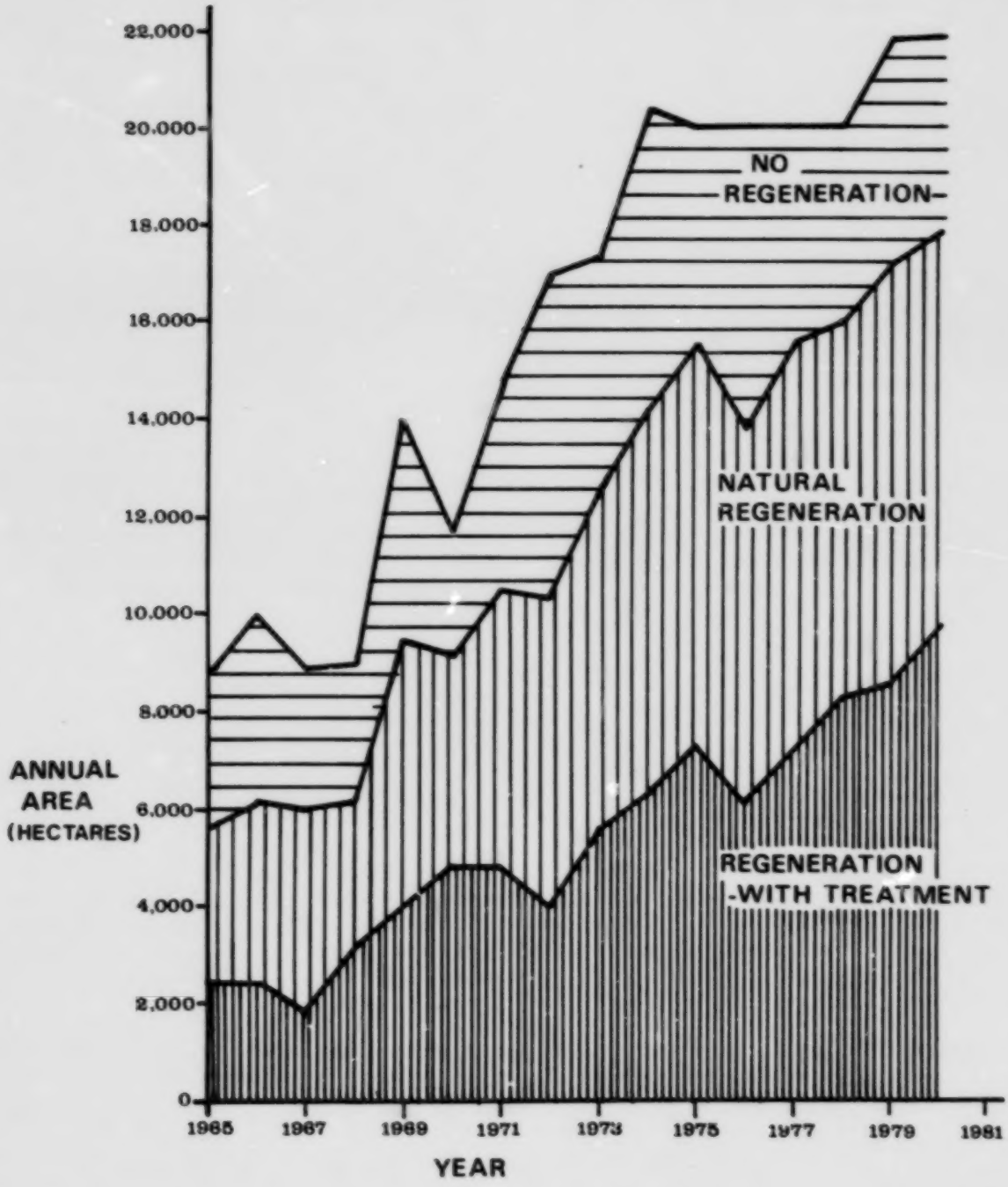
The effects of this situation can be expressed in a supply demand relationship between current management levels, the status quo in growth and expected and projected industry growth (Graph 2 and Appendix 10).

In the study area, approximately 60 to 150 hectares of forested land are harvested annually and therefore without any reforestation it can be assumed that one third to two thirds of the cutover lands will not regenerate properly. The alienation of forested land to non-forestry uses will compound the problem of meeting the required wood supply volumes necessary for continued growth and maintenance of the forest industry. These concerns of reforestation and land alienation are the principal forestry issues for this study area.

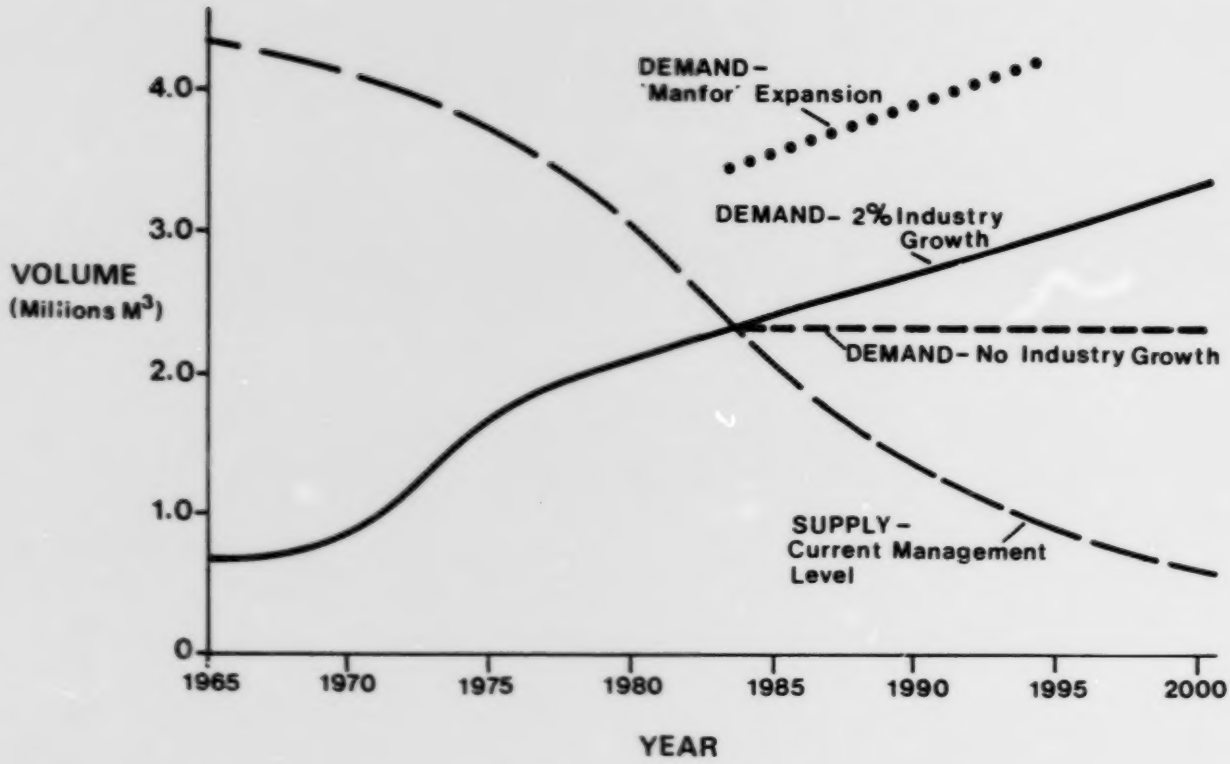
It has been recommended by Forestry Branch that the Forestry Plan be implemented, and that the government have a goal of meeting the wood fibre requirements of the forest industry based on a two percent industrial growth. This would raise the value of Provincial shipments to $500 million and increase direct employment to 6,600 man years by the year 2000. This would result in corporate and individual tax revenues of about $26.8 to $32.5 million.

To reach this objective a cost-shared forestry program between Canada and Manitoba has been signed to permit expanded effort to maintain the forest resource as it is harvested as well as to enhance it. These public funds will only be spent on lands where a long term commitment to forestry use exists.

**Graph 1. Estimated Reforestation Status for Manitoba**
(Forestal International Limited, 1982).



## Graph 2. Softwood Supply and Demand for Manitoba




## Summary

1. Economic significance of the forest industry in the area currently to Provincial economy is $283,000 per year. Optimum utilization of the AAC would inject in excess of $3,820,000 to the Provincial economy per year. Additional jobs would also be created for forest management and renewal efforts.

2. The 1977 Riverton Fire destroyed vast quantities of merchantable timber subsequently reducing the AAC within the study area. The AAC will be recalculated after 20 and 40 years and will most likely be increased as long as the burn area has been restocked naturally and/or artificially. This potential increase in AAC will increase the economic significance of this area.

3. The establishment of a provincial forest would help in reaching the goals as identified by the 20 year forest management plan for the Province of Manitoba and would alleviate concerns regarding future alienation of forested lands and protecting all public and private forestry investments.

4. The Province has a commitment to Abitibi-Price Inc. to maintain the area as IWSA #2 to meet Abitibi's short and long term demands for wood fibre and commitments also exist to five other timber allocation holders and two communities to supply them with wood fibre.

5. The importance of IWSA #2 has become even more important during the past several years to Abitibi-Price Inc. due to the following:

   a) Large area allocations in critical timber supply areas of productive forested land to other uses where such allocations exclude timber harvesting.

   b) The 1980 and 1983 fire seasons on the east side of lake Winnipeg have reduced the volumes of softwoods available for timber harvesting.

6. The study area because of its accessibility and proximity to market, will experience a level of demand for forest products and subsequently industrial growth greater than the Provincial average of two to three percent annually.

7. The hardwood resources of the area will be utilized in the future and therefore will play an important role in the establishment of new industry.

8. Without a long term commitment to forestry use, there is reluctance to spend Provincial funds in reforestation and management which is a requirement for long term stability of wood fibre volumes for industry use. There is and will be a reluctance to expand forestry operations in the area if the land base is not protected for long term forestry use.

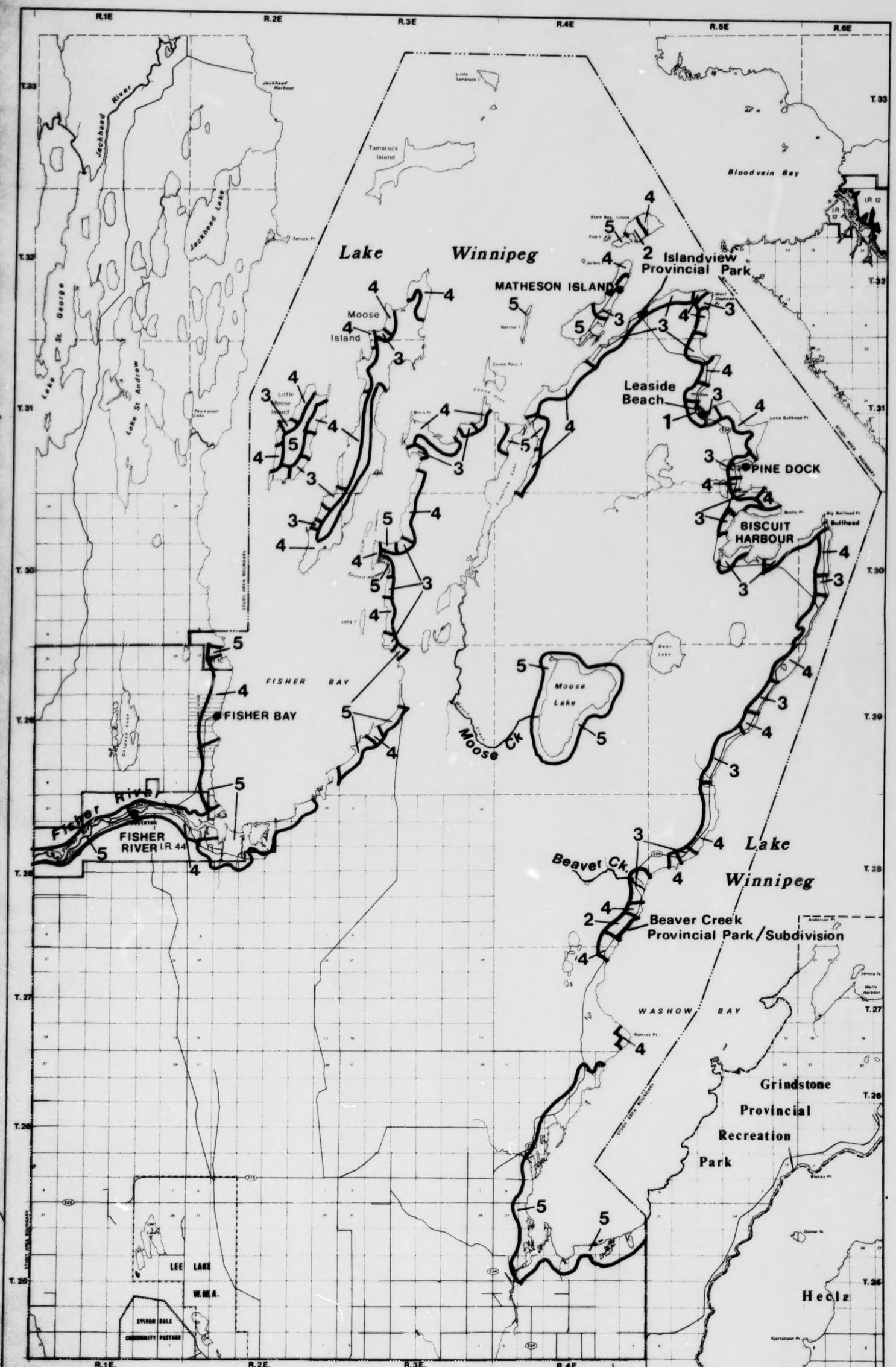
# SECTION 5. OUTDOOR RECREATION

Compared to the rest of the province the study area has relatively little structured recreational use. The recreational use that does occur is centred at Beaver Creek Provincial Recreation Park, Beaver Creek Subdivision and Leaside Beach Subdivision (Map 23). There are no private recreational facilities in the plan area.

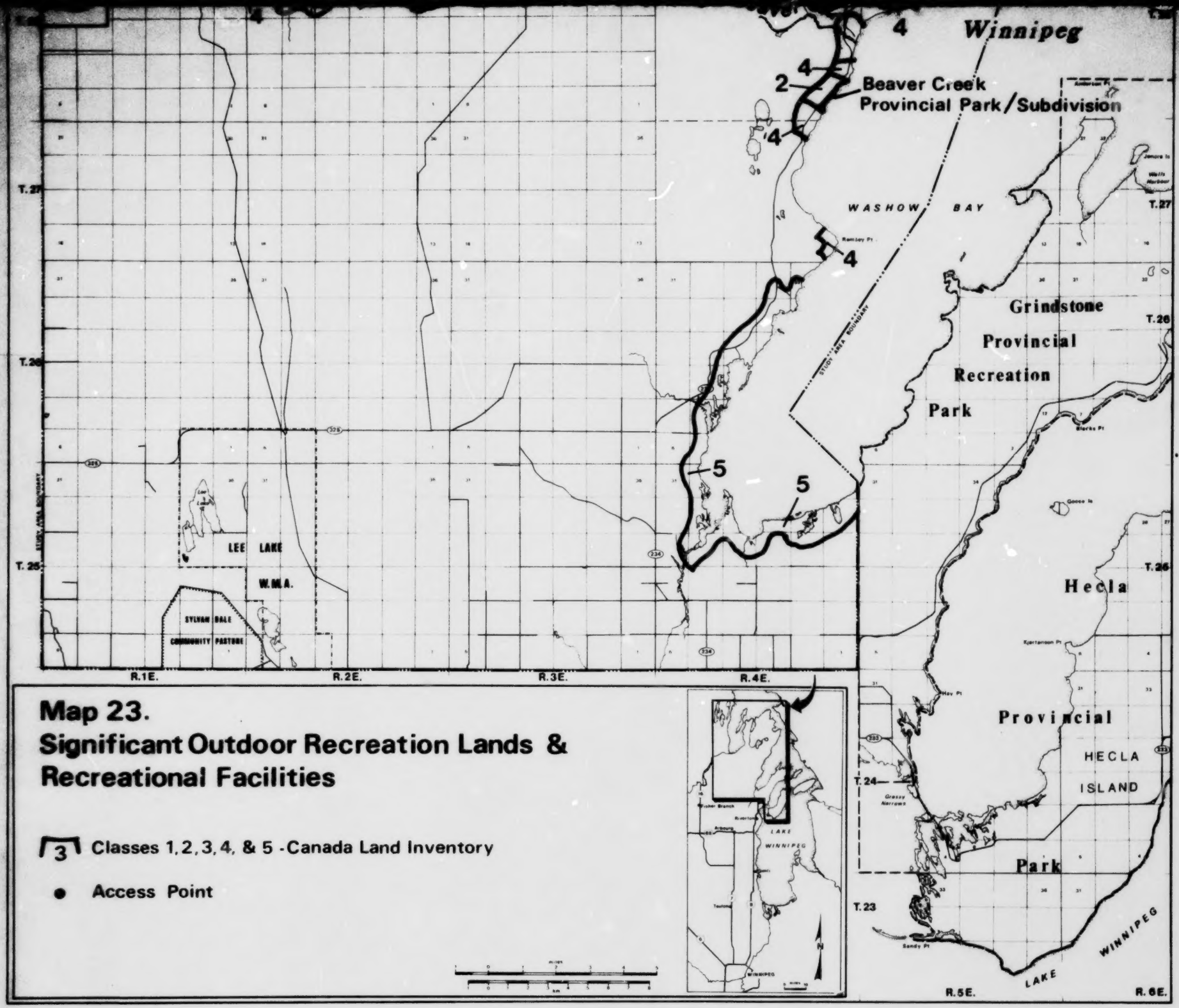
Extensive recreation is more widespread in the study area. It usually consists of hunting and fishing, and usually occurs along roadways, waterways and shorelines. Forestry roads and the three provincial roads - PR 234, PR 224 PR 325 - are the main access routes. Recreational activities along shorelines radiate from water access sites. These include Beaver Creek, Biscuit Harbour, Pine Dock, Leaside, Matheson Island, Fisher River and Fisher Bay. The Fisher River, Moose Creek and Beaver Creek also receive some extensive recreational use.

It is expected that recreational use will continue in this pattern. Little expansion of recreational facilities is anticipated as there are no indications that demand is exceeding supply. Any expansion that does occur will likely be in those areas already used for recreation. This is in part because the presently used areas have the highest CLI capability for recreation. The rest of the study area is Class 4 or lower land and is generally unsuitable for common recreational use.

The Matheson Landing, Leaside Beach and Beaver Creek areas require protection and buffering from any land uses that could degrade the area's existing recreational use or its potential for additional use. Ordinary buffering of shorelines will preserve the recreational integrity of most of the rest of the study area. Currently there are no identified sites of natural or cultural heritage that require protection. As sites are identified they should be given suitable protection and buffering.




**Map 23.**
**Significant Outdoor Recreation Lands &**




# Map 23.
# Significant Outdoor Recreation Lands & Recreational Facilities

3 Classes 1, 2, 3, 4, & 5 - Canada Land Inventory

● Access Point

# SECTION 6. WILDLIFE

## Introduction

The Study Area is comprised of a great variety of habitats supporting an abundance and diversity of wildlife species. The major habitat types include open bogs, black spruce-tamarack swamps, hardwood ridges, mixed wood stands, pure softwood stands (jackpine, white spruce, black spruce), marshes, shoreline, islands, and shoals of Lake Winnipeg, as well as inland lakes and associated creeks.

The most important wildlife species within the study area is moose. The hardwood ridges and mixed wood stands are capable of supporting a high wintering density of moose and for this reason, moose are relatively abundant in the study area.

Other important wildlife habitat occurs in the vicinity of the many lakes, streams, open bogs, and shorelines of Lake Winnipeg which provide nesting sites and brood rearing habitat for many species of ducks, Canada Geese and Sandhill Cranes.

## Wildlife Capability and Prime Habitat

A large portion of the area has been Classed CLI 1, 2 and 3, habitat for ungulates (Map 24). This habitat provides the primary wintering areas for ungulates, specifically moose and deer. The key wintering area is located within the area of the 1977 Riverton burn. Other important wintering areas for moose are in the vicinity of Moose Lake and Evenflow Lake. There is a noticeable movement of deer and moose from their summer range to the wintering habitat in the area.

All significant wetlands in the study area are greater than 40 acres in size. Shoreline, islands, inland lakes and bogs provide breeding habitat for Giant Canada Geese and other breeding waterfowl. Density of breeding Canada Geese is low though, as preferred nesting sites are limited. Similarly, density of other breeding waterfowl is likely low as prime habitat is restricted to marsh areas adjacent to two major bays of Lake Winnipeg and several of the inland lakes. The south portion of Fisher Bay, south portion of Washow Bay, Goldeye Lake and Evenflow Lake are significant staging areas for waterfowl particularly Canada Geese, Snow Geese, and ducks.

Waterbodies and waterways including islands and shorelines are important to wildlife as waterfowl breeding habitat, waterfowl staging areas, breeding habitat for colonial and island nesters, moose habitat, and habitat for fur-bearers. These same areas are important to wildlife users for trapping, big game hunting (particularly moose), and waterfowl hunting. The areas of most importance are Washow Bay, Fisher Bay, Lee Lake, Moose Lake, Goldeye Lake, Even-flow Lake, Beaver Creek, Moose Creek, and Washow Bay River.

## Species Discussion

Moose

Much of the Study Area consists of CLI Classes 1, 2 and 3 habitat for ungulates, specifically moose and deer. The areas in the vicinity of Moose Lake and Evenflow Lake, Moose Island, Little Moose Island, and the 1977 Riverton burn provide some of the best moose habitat in the Province. Open bogs, marshes, lakeshores, inland lakes, and islands provide good summer habitat for moose. Deciduous cover on the ridges affords excellent wintering habitat.

Density of moose in the study area is among the highest in the Interlake Region. Presently there is an average of less than 0.2 moose per square km (0.5 per square mile) over the whole study area. However, moose density is probably as high as 0.6 moose per square km (1.5 moose per square mile) in the areas of prime wintering habitat. The population of moose has been suppressed by overharvest and is estimated at 300-400 animals at present. However, current habitat conditions could support 600 to 800 moose. Optimum moose densities would range from 0.2 moose per square km in the bogs and coniferous forest to 0.8 moose per square km in the CLI Classes 1 and 2 habitat (primarily deciduous and mixed wood cover). Thus the optimum moose population would exceed 1,000 animals.

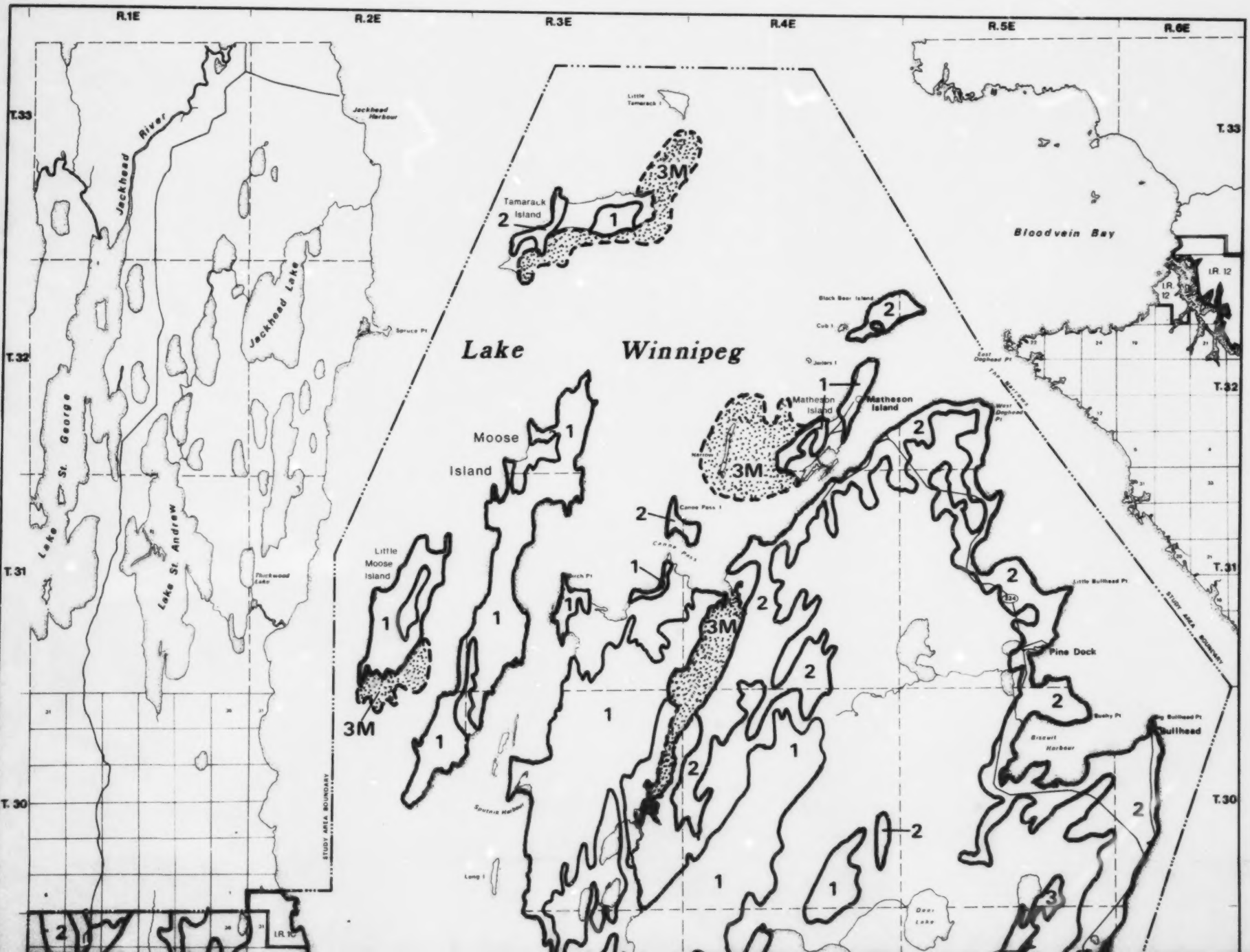
Moose productivity within the study area, has been the highest in the Province during recent years, as measured by calf survival at six months of age in the wintering areas. This productivity is a result of the quality and relative abundance of habitat, particularly in the area of the 1977 Riverton burn, but is not confined to that area. Demand for moose is high by resident sport hunters and Treaty Indians, and it currently exceeds the supply.

Deer

Although not as important as moose, the habitat supports substantial numbers of white-tailed deer. Deer are common in the southern portion of the study area, but their density decreases markedly towards the central and northern portions of the peninsula. No estimates are available for deer population densities specifically within the area, but similar habitat elsewhere in the Interlake supports 0.4 to 2.0 deer per square km.

Deer are utilized by Treaty Indian hunters and resident sport hunters. Supply of deer currently exceeds the demand with the population relatively high. However as this portion of Manitoba represents the northern extent of white-tailed deer range, there are several limiting factors which limit deer numbers. These include climate, with severe winter weather restricting density, as well as suitable habitat. Available deer habitat is limited to small blocks of upland habitat (deciduous cover) in the southern portion of the study area. Large amounts of open bog and softwood (coniferous) cover cannot be considered as deer habitat. The large burn in the central portion of the area serves as a wintering area for most of the deer herd on the peninsula.

All areas of CLI Class 2 and 3 deer habitat require protection from removal of native cover to maintain prime deer wintering habitat.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T.33
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T.31
T. 30
Jackhead River
Jackhead Harbour
Jackhead Lake
Spruce Pt
Lake St. George
Lake St. Andrew
Thickwood Lake
STUDY AREA BOUNDARY
Little Tamarack I
Tamarack Island
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1
Lake Winnipeg
Black Bear Island
Cub I
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Matheson Island
Moose Island
Little Moose Island
Canoe Pass I
Canoe Pass
Birch Pt
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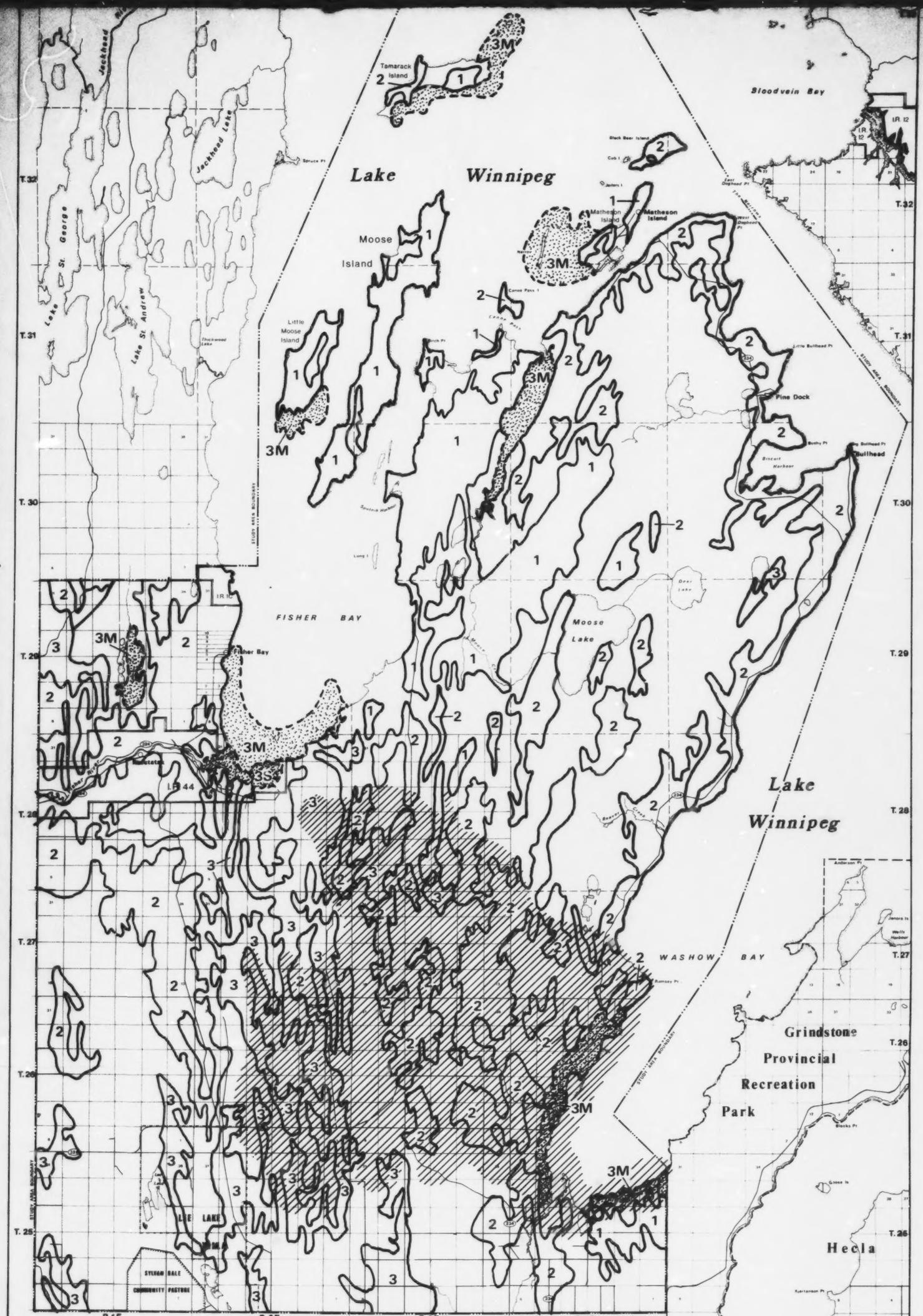



## Map 24.
## Wildlife Capability (Canada Land Inventory)

- Ungulate Capability – classes 1, 2, 3
- Waterfowl Capability – classes 3S, 3M
- Riverton Fire Area 1977

### Waterfowl

Virtually all species of ducks common to this portion of the Province, Giant Canada Geese, and Sandhill Cranes are known to breed in the area. Breeding densities would generally be considered low due to the limited amount of prime habitat for most species. Waterfowl nesting habitat is confined to the marsh areas along the shorelines of Lake Winnipeg and inland lakes and bogs.

Of most significance are the waterfowl staging areas including Washow Bay, Fisher Bay, Lee Lake and Goldeye Lake. Concentrations of migrating waterfowl stop over on these waterbodies thus affording excellent waterfowl hunting opportunity on both the marshes and adjacent croplands.

### Upland Game Birds

Ruffed grouse, sharptailed grouse, spruce grouse, and grey partridge are all present. The abundance of these upland game bird species provides excellent game bird hunting opportunity.

### Other Wildlife

The diversity of habitat on the peninsula supports a myriad of wildlife species. A recent Resource Inventory of Hecla Island (1979) listed 185 avian species present on or around the island. With more abundant and varied habitat on the Washow Bay - Fisher Bay Peninsula, it is likely that at least that number of species of birds are present. Several require special consideration in planning development where habitat may be disturbed. These include:

a) Raptors - Bald Eagle, Osprey, Great Grey Owl

b) Colonial Nesters - Great Blue Heron, White Pelicans, Western Grebes, Double Crested Cormorants, several species of terns and gulls.

### Furbearers

A variety of furbearers are common to the study area. The northern portion of the peninsula is designated as the Bullhead Registered Trapline Block. The balance is part of the Open Area and designated as the Interlake Special Fisher Trapping Area. The most important furbearers from an economic perspective are lynx, fox, coyote, mink, beaver and muskrat. Other furbearers within the area include black bear, timber wolf, fisher, otter, and ermine.

## Rare and Endangered Species

No endangered species have been specifically identified although several rare, threatened and uncommon species are present and known to breed in the area. These include Great Grey Owls, White Pelicans, Bald Eagle and Osprey.

## Designated Wildlife Lands

The following lands (Map 25) are designated for wildlife purposes: Lee Lake Wildlife Management Area (also a Migratory Game Bird Refuge), Lee Lake Game Bird Refuge, Bullhead Registered Trapline Block, and the Interlake Special Trapping Area.

## Wildlife Investments

Although there are currently no Ducks Unlimited projects within the study area, several wetlands have been investigated by Ducks Unlimited and are under consideration for waterfowl habitat development. These include Evenflow Lake, Lee Lake, and an area in township 25 range 3 east where there is considerable local support for wildlife habitat preservation and development.

## Areas of Significant Wildlife Recreational Value

The following areas are important for wildlife recreational purposes and are additional to the areas previously identified (Map 26).

a) Riverton Burn, Moose Lake, Evenflow Lake afford excellent moose hunting opportunity.

b) Marshes on Washow Bay provide excellent waterfowl hunting opportunity.

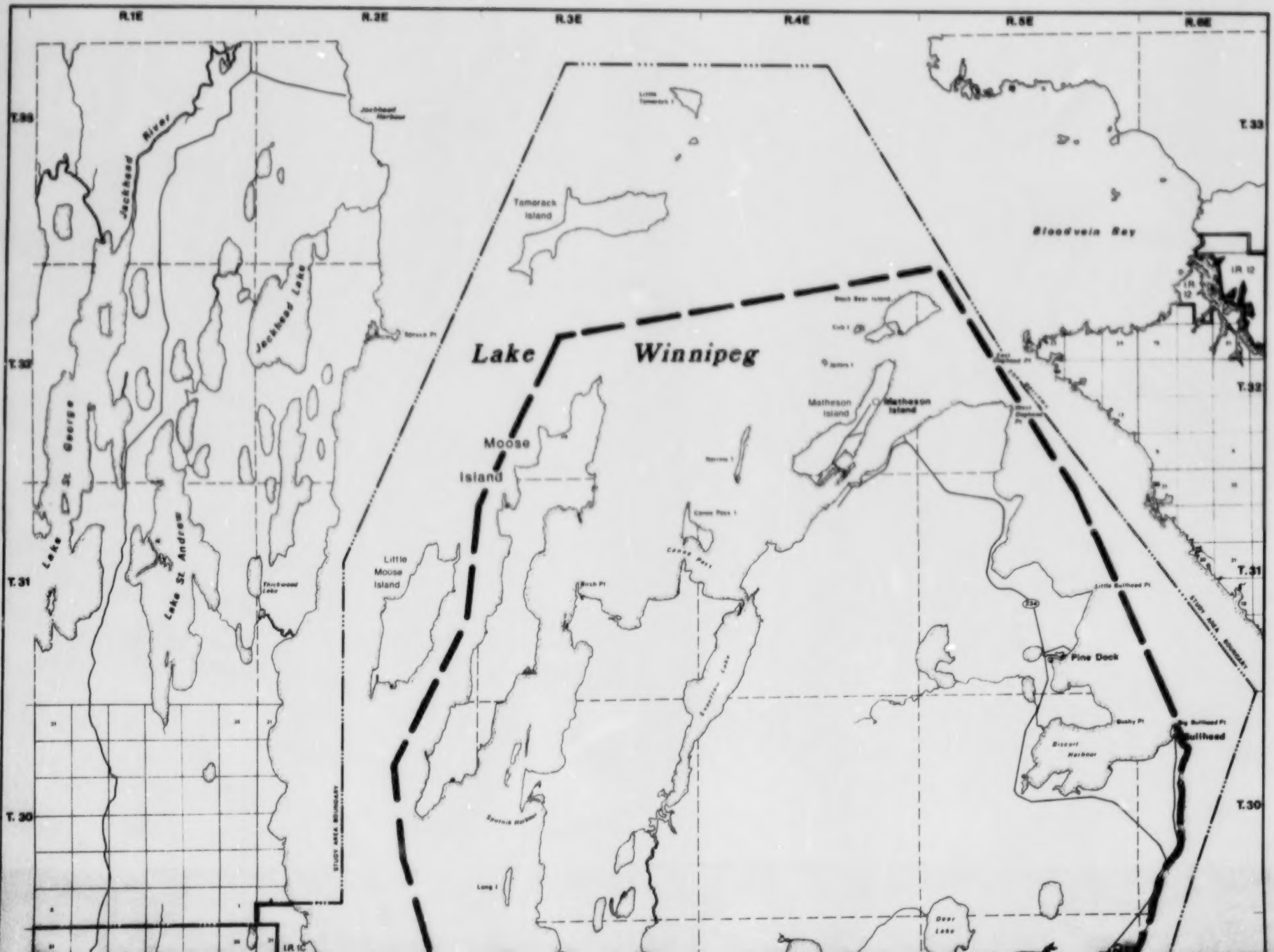
c) Shorelines and islands of Washow Bay afford good opportunity for viewing bird life including colonial nesters, shorebirds, waterfowl and raptors.

## Access to Areas of Significant Wildlife Resources

Only a few all-weather roads (PR 224, 234 and 325) exist in the study area. The lack of all-weather access to most of the peninsula is, at least in part, responsible for the relative health of the moose population and the variety and abundance of birds that require remote areas for breeding habitat.

Two other seasonal resource roads break up the southern and western portions of the area. These are commonly known as the Fish River Road to Koostatak and the Sisterline Road.

Other than the aforementioned roads, access by vehicles is restricted to winter only, and by boat or aircraft during other times of the year. Access development will probably be the most significant factor affecting wildlife resources. Any increase in access should be well planned to have minimal impact on sensitive wildlife areas such as moose wintering areas, colonial nesting birds, waterfowl nesting, etc. Where possible, access should be confined to winter use only, as all-weather access will have a detrimental affect on significant wildlife resources.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Moose Island
Little Moose Island
Matheson Island
Bloodvein Bay
Jackhead River
Jackhead Harbour
Jackhead Lake
Lake St George
Lake St Andrew
Thickwood Lake
Spruce Pt
Birch Pt
Canoe Pass
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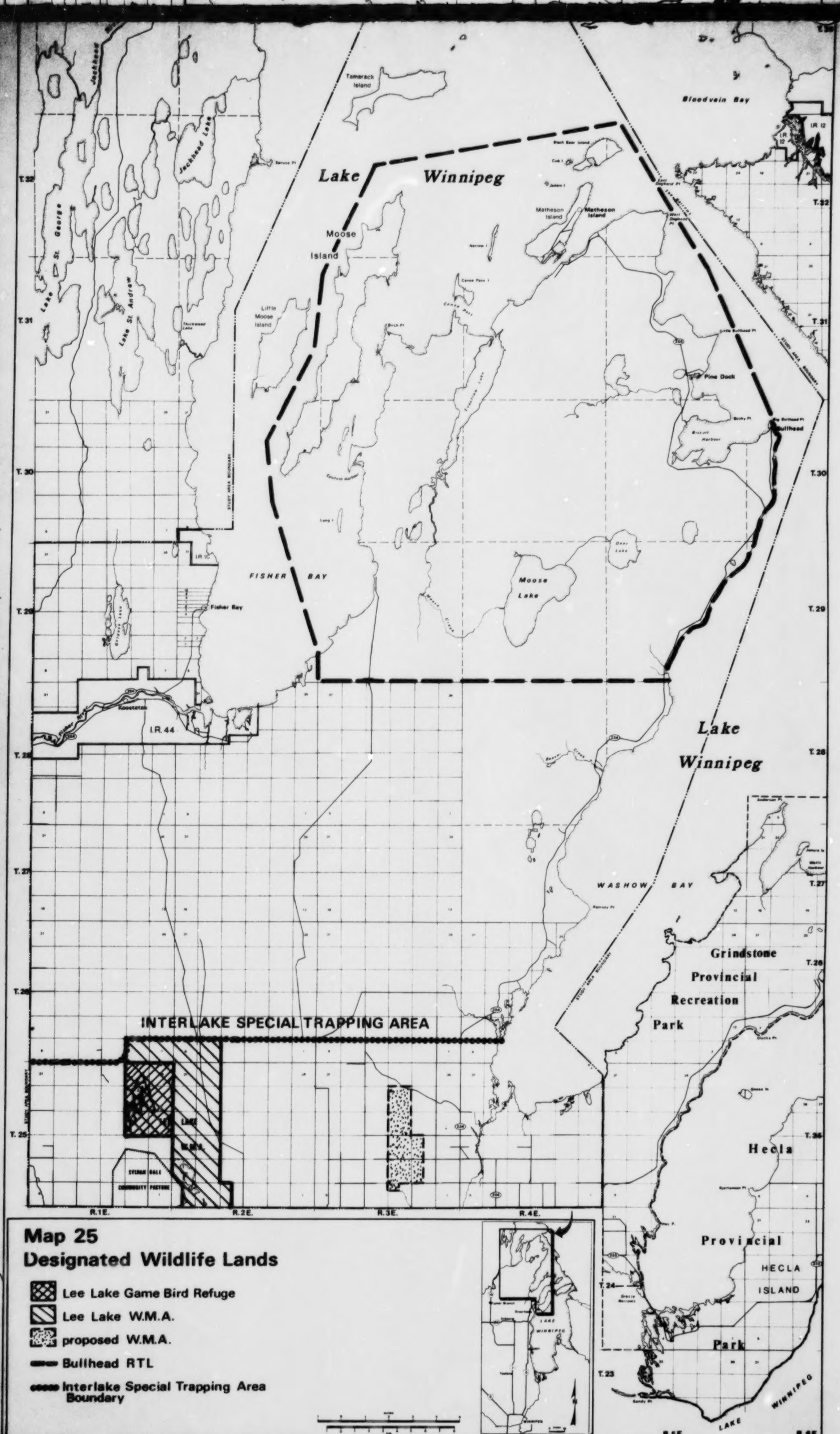
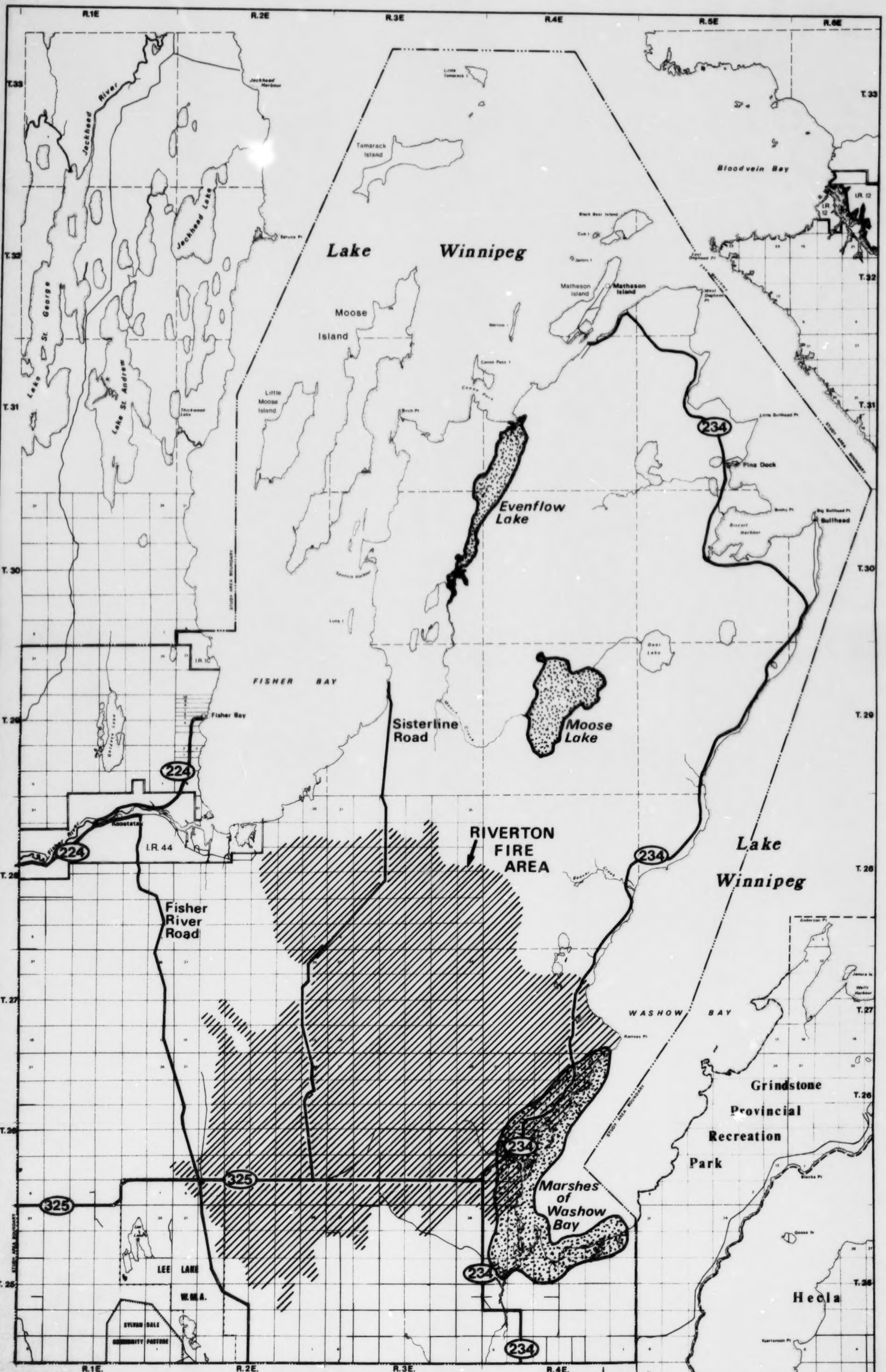
STUDY AREA BOUNDARY




## Map 25
## Designated Wildlife Lands

- Lee Lake Game Bird Refuge
- Lee Lake W.M.A.
- proposed W.M.A.
- Bullhead RTL
- Interlake Special Trapping Area Boundary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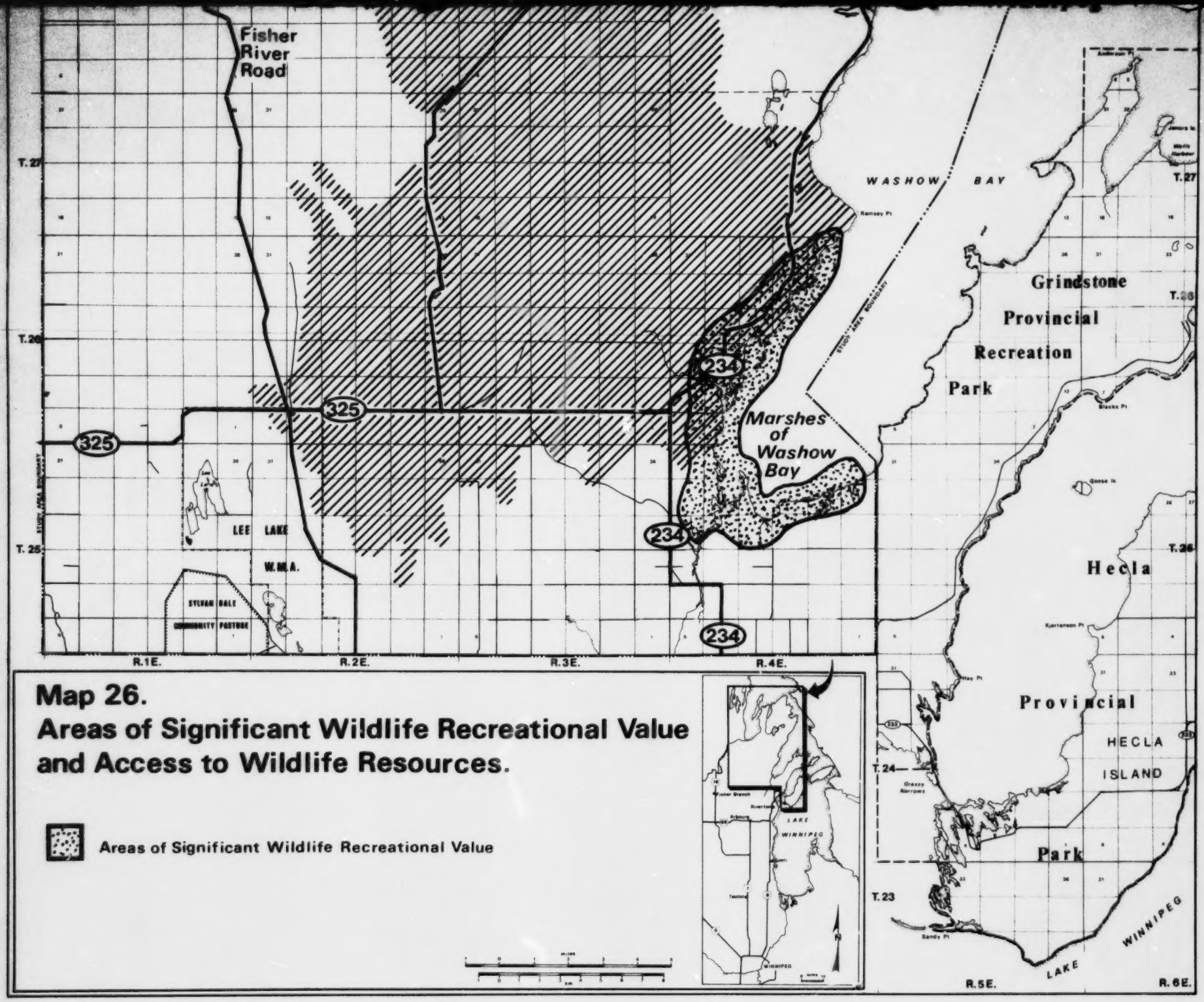
T.26
T.25
Jackhead River
Jackhead Harbour
Jackhead Lake
Lake St George
Lake St Andrew
Tamarack Island
Lake Winnipeg
Moose Island
Little Moose Island
Matheson Island
Bloodvein Bay
I.R. 12
Black Bear Island
Cook I
Jenkins I
Canoe Pass I
Canoe Pass
Birch Pt
Spruce Harbour
Luna I
Deer Lake
Little Bullhead Pt
Pine Dock
Big Bullhead Pt
Bullhead
Biscuit Harbour
Evenflow Lake
Moose Lake
I.R. 10
FISHER BAY
Fisher Bay
Sisterline Road
224
Wanipigow River
Hoodstalk
I.R. 44
RIVERTON FIRE AREA
234
Fisher River Road
Lake Winnipeg
WASHOW BAY
Ramsey Pt
Grindstone Provincial Recreation Park
Marshes of Washow Bay
325
LEE LAKE W.M.A.
SYLVAN DALE COMMUNITY PASTURE
Hecla Provincial
Map 26.
Areas of Significant Wildlife Recreational Value




# Map 26.
# Areas of Significant Wildlife Recreational Value and Access to Wildlife Resources.

Areas of Significant Wildlife Recreational Value

## Demand

### Moose

Demand for moose is high in the study area. A suppressed moose population cannot currently meet the demand. Treaty Indian harvest is estimated at 30 animals annually. This is limited only by access and the real demand is likely double that harvested. Moose are harvested mainly by hunters from the Bloodvein, Peguis, Fisher River, Jackhead Reserves and Winnipeg based Treaty Indians.

Resident sport hunters harvest approximately 20 moose annually, with restrictions on sex of harvest and access. The estimated value of the moose harvested annually is $100,000 (50 moose x $2,000 per moose).

Demand is expected to increase, thus further limiting the opportunity to hunt moose. Under optimum management (including regulation of harvest) it is estimated that up to 100 moose could be harvested annually at a value of $200,000 (1983 value).

### Deer

There is currently a medium demand for deer in the study area. Use by resident sport hunters is low, while demand by Treaty Indian hunters is high in particular areas. It is estimated that less than 200 deer are harvested annually. This could be doubled to 400 annually with little impact on the herd providing habitat conditions remain stable.

Demand for deer is expected to increase moderately by sport hunters as increased pressure is put on Crown land areas for deer hunting. Demand for Treaty Indian use is expected to increase substantially with increasing populations in the vicinity of the study area.

### Waterfowl/Upland Game Birds

Demand for waterfowl and upland game bird hunting varies from low in the remote portions of the study area to high in the marsh areas and private croplands adjacent to the staging areas. Demand for waterfowl hunting is not expected to increase substantially, but it will remain at the existing level. Increased use could be made of the less accessible areas.

### Furbearers - Trapping

Demand for furbearers is currently low, other than for high priced species such as lynx and fisher. Average annual fur production in the Bullhead Community Trapping Block is $13,000. Estimated annual production for the Open Area is $12,000-$15,000. Estimated annual production is therefore $25,000-$28,000. Furbearers are presently under utilized except for species in high demand. It is not likely that demand for fur will change appreciably in the future, except when sporadic price increases occur for specific furbearers.

## Areas Protecting Significant Provincial Wildlife Resources

Demand for moose by resident sport hunters currently exceeds supply. Management restrictions limit the sport harvest to about 20 male animals annually. Unregulated Treaty Indian harvest, estimated at about 30 animals annually, is the major limiting factor. Increased development, particularly access, will result in a further decline of the moose population.

Because of the high quality of habitat, as evidenced by the highest rate of productivity for moose in the Province, and the high demand for the moose resource, there is need of an area to protect the prime moose habitat and the nucleus of this important moose herd (Map 27). This area would contain primarily CLI Classes 1 and 2 moose habitat. It is estimated that up to 0.8 moose per square kilometer (600-800 moose) could be supported by this habitat with management efforts. A herd this size could meet the demand for moose within this portion of the Interlake.

Development of access into this area should be restricted. Forest extraction is permissible only if complementary to existing habitat but access should be in winter only.

Several production areas for waterfowl, primarily Giant Canada Geese, should be protected from development to preserve prime breeding habitat. These include marsh areas adjacent to Washow Bay, Fisher Bay, and Lee Lake WMA. Development of these areas will result in decreased breeding habitat for Giant Canada Geese and other waterfowl, as well as increased waterfowl crop damage on developed lands. These same locations serve as waterfowl staging areas and should be protected to maintain the large concentrations of migrating waterfowl which offer excellent waterfowl hunting opportunity in the Riverton - Washow Bay areas.

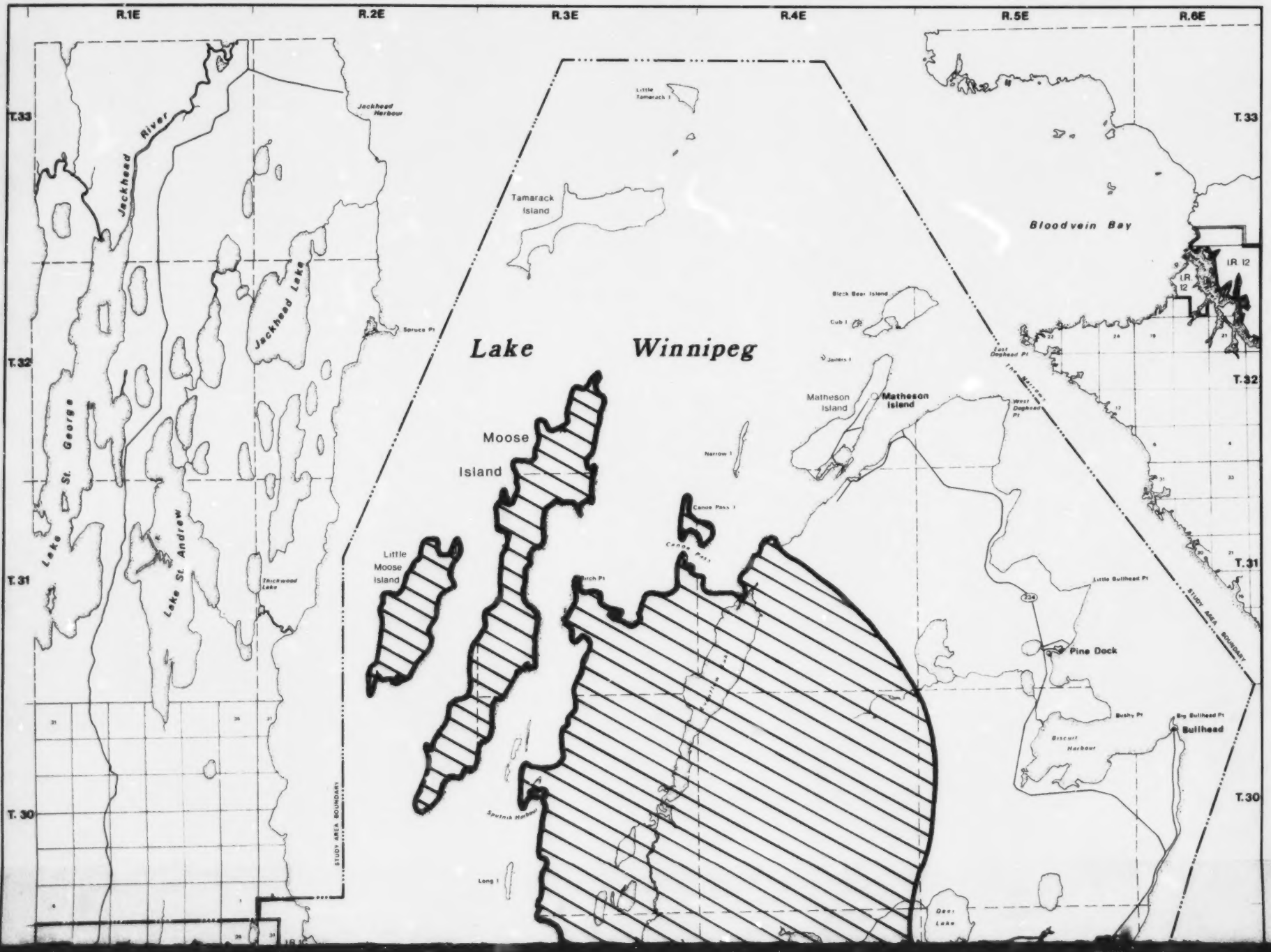
## Fragile Areas

Although specific locations have not been identified, there are a number of other habitat types which provide nesting and brood rearing sites for various species and which should be considered as fragile in nature. These areas should be protected prior to any development or intensive use. They can be categorized as follows:

a) Nesting colonies - including gulls, terns, pelicans, Great Blue Herons, etc. primarily on islands in Lake Winnipeg.

b) Raptors (shoreline nesters) - Ospreys, Bald Eagles - mature forests on shorelines of Lake Winnipeg.

c) Large owls, Sandhill cranes - Great Grey Owls, Great Horned Owls, Sandhill Cranes - make use of bogs and remote black spruce tamarack swamp areas for nesting.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Jackhead River
Jackhead Harbour
Jackhead Lake
Spruce Pt
Lake St. George
Lake St Andrew
Thickwood Lake
STUDY AREA BOUNDARY
IR 10
Little Tamarack I
Tamarack Island
Lake Winnipeg
Moose Island
Little Moose Island
Narrow I
Canoe Pass I
Canoe Pass
Birch Pt
Sputnik Harbour
Long I
Black Bear Island
Cub I
Jaiters I
Matheson Island
Matheson Island
East Doghead Pt
West Doghead Pt
Bloodvein Bay
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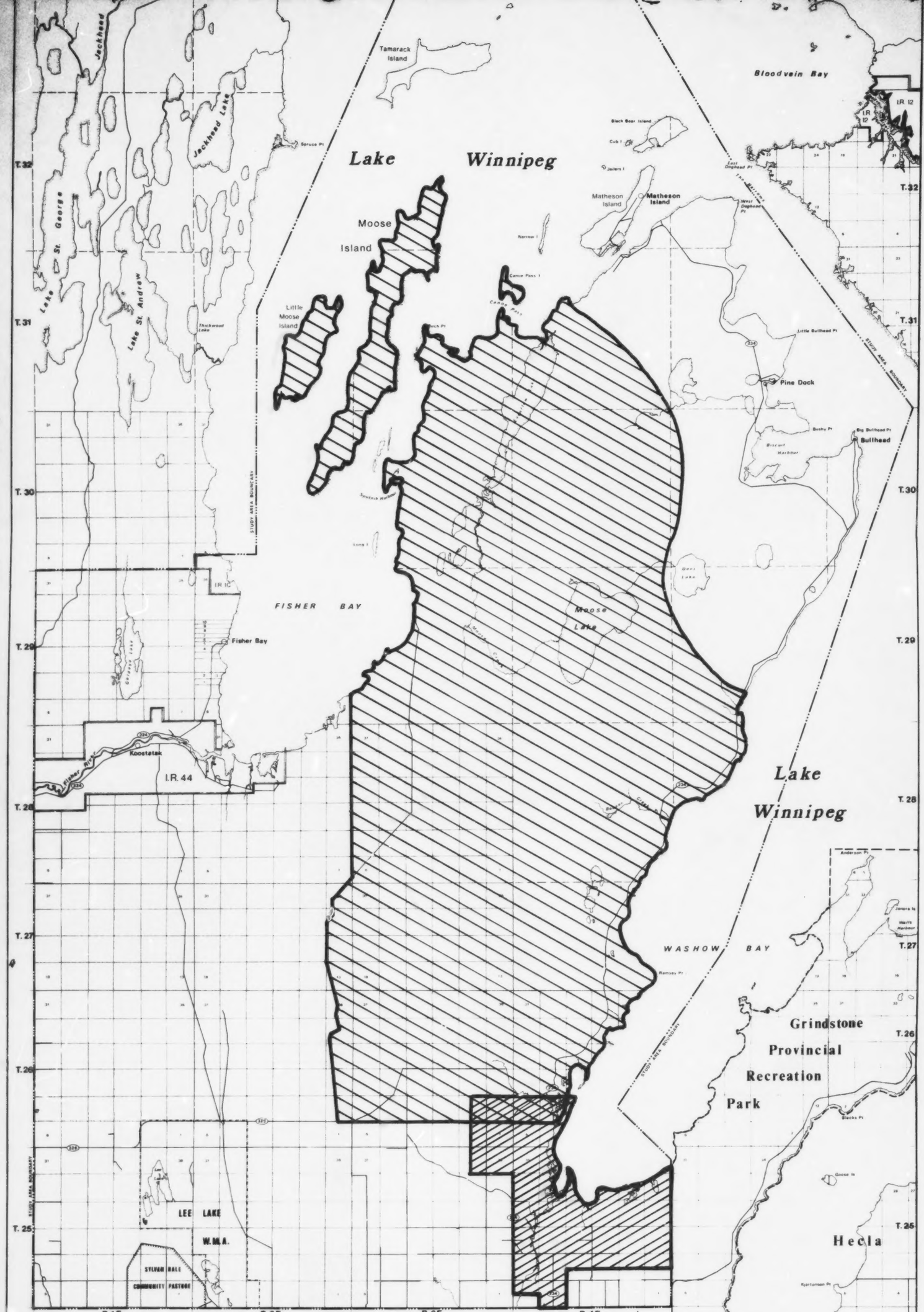
Pine Dock
Bushy Pt
Big Bullhead Pt
Bullhead
Biscuit Harbour
Deer Lake
STUDY AREA BOUNDARY




## Map 27.
## Wildlife Areas & Depredation Zones

Wildlife Area-Moose

Depredation Zone

## Waterfowl Depredation and Livestock Predation

Severe waterfowl depredation problems are encountered in the area (Map 27). Intensive waterfowl damage prevention efforts are directed towards the area, and compensation payments are frequently made for waterfowl crop damage. Significant waterfowl staging areas on Fisher Bay, Washow Bay, Hecla Marshes, Goldeye Lake, and Lee Lake result in large fall concentrations of migrating Canada Geese, Snow Geese and ducks. All croplands (particularly cereal crops and to a lesser extent forage crops) are prone to waterfowl damage. Sporadic but severe damage by Sandhill Cranes can be expected as damage is common where breeding and summering habitat has been developed for agricultural use. Sandhill Crane damage is not restricted to the fall as is other waterfowl damage, but rather can occur throughout the period from early spring to early fall. The damage to crops by waterfowl in the Riverton-Washow Bay area in recent years has been significant and consideration should be given to this factor when planning future agricultural development.

Losses of livestock to predators is common. The major predator problem has been timber wolf but losses also occur to coyote, red fox, and black bear. Costly preventative or remedial measures are effective only for the short term. Intensive timber wolf control efforts have proven largely ineffective as the problem is recurring, particularly in the vicinity of the Sylvan Community Pasture. Actual numbers of livestock lost to timber wolf are usually minor although often viewed as a major threat. Conversely coyote and fox can cause severe losses to small livestock (usually poultry).

With the abundant habitat for all these predators frequent preventative and remedial action will be required in response to predator problems.

## Concerns and Issues

### Moose Management Area

Lands on the Washow Bay-Fisher Bay Peninsula are ranked as CLI Classes 1, 2 and 3 moose habitat. Much of these lands support the highest productivity of moose in the Province (and in North America) in recent years. The excellent moose habitat, much of which was rejuvenated by the large 1977 forest fire, should be protected from conflicting land use to prevent the destruction of habitat by agricultural development and to prevent any increased access into remote areas.

### Waterfowl Habitat

Southern portions of the study area are the most productive for waterfowl. Ducks Unlimited is becoming increasingly attracted to these areas of Crown land for their waterfowl habitat development projects. At the same time, landowners in these marginal areas are beginning to voice opposition to projects which they expect will increase damage to their crops by producing additional waterfowl. This conflict needs to be addressed in planning future agricultural land development.

### Waterfowl Depredation

Any agricultural development is highly prone to crop damage by waterfowl. Recent development of croplands in the Washow Bay - Riverton area had demonstrated the problem, and due consideration should be given to the problem in planning future agricultural expansion. Waterfowl damage prevention and compensation costs borne by the Federal and Provincial governments may be avoided.

### Livestock Predation

Livestock production will suffer losses to predators, primarily timber wolf, fox, and coyote. Predator control, particularly timber wolf control, is very costly and effective only for the short term. Development of lands should include plans for preventative measures.

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# APPENDICES

APPENDIX 1. DESCRIPTION OF STUDY AREA

The following described land in the Province of Manitoba constitutes the Washow, Fisher Bay Study Area and is described as follows:

Firstly:

Sections 8, 28 and 29, the West half of Sections 3 and 4, the south half of Section 9, fractional sections 12, 13 and 14 lying outside the Sylvan Dale Community Pasture, the south half and northeast quarter of Section 17, the west half and northeast quarter of Section 18, the southwest quarter of Section 19, the east half of Section 20, the south half and northeast quarter of Section 27, the south half of Section 32, the west half of Section 33, the east half of Section 34, all in Township 25, Range 1 East; Sections 1, 2, 9, 11, 12, 13, 16, 21-28 and 33-36 inclusive, the northeast quarter of Section 4, fractional sections 6 and 7 lying outside the Sylvan Dale Community Pasture, the east half of Sections 3 and 10, and the south half and northeast quarters of Sections 14 and 15, all in Township 25, Range 2 East; Sections 1, 2, 3, 10, 11, 12, 14, 15, 19, 22, 27, 30, 31 and 35, the west half of Sections 6 and 7, the northeast quarter of Section 9, the southwest quarter of Section 13, the northwest quarter of Section 17, the west half and northeast quarter of Section 18, the southwest quarter of Section 20, the west half and northeast quarter of Section 23, the southwest quarter of Section 24, the northwest quarter of Section 25, the south half of Section 26, the northeast quarter of Section 28, the west half and northeast quarter of Section 34, all in Township 25, Range 3 East; Sections 6, 11, 12, 13, 14, 21-29, 32, 33 and 36, the south half and northwest quarter of Section 7, legal subdivision 13 of Section 8, the east half and southwest quarter of Section 15, the west half and northeast quarter of Section 16, legal subdivisions 9 and 16 of Section 17, the southwest quarter, northeast quarter, legal subdivisions 2, 7 and the west half of legal subdivision 8 of Section 18, the north half and legal subdivisions 1, 7 and 8, and the east half of legal subdivision 2 of Section 19, the north half and southeast quarter of Section 20, the north half of Section 31, excluding Lake Winnipeg, all in Township 25, Range 4 East; Sections 7-18, 20-29 and 31-36 inclusive, the east half of Section 3, the west half and northeast quarter of Section 4, the northeast quarter of Section 5, the west half of Section 6, the south half and northeast quarter of Section 19 and the north half and southeast quarter of Section 30, all in Township 26, Range 1 East; all of Township 26, Range 2 East, excluding Sections 5 and 6; Sections 2, 3, 6, 7, 8, 10, 13-36 inclusive, the west half of Section 9, the southwest quarter of Section 12, all in Township 26, Range 3 East; all of Township 26, Range 4 East excluding Section 7, the south half of Section 6, and excluding Lake Winnipeg; All of Township 27, Range 1 East excluding the north half and southeast quarter of Section 31 and the north half of Section 32; all of Township 27, Ranges 2 East and 3 East; all of Township 27, Range 4 East excluding Lake Winnipeg; Sections 1-4 and 19-15 inclusive, the east half of Section 5, the northwest quarter of Section 6, the south half and northeast quarter of Section 7, the north half and southeast quarter of Section 8, the north half and southeast quarter of Section 16, the south half and fractional northwest quarter lying outside Indian Reserve I.R. 44 of Section 17, the fractional northeast quarter of Section 18 lying outside Indian Reserve I.R. 44, fractional sections 20, 21, 22, 23, 24, 29 and 30 lying outside Indian Reserve I.R. 44, the south half of Section 31, the fractional northeast quarter of Section 32, lying outside Indian Reserve

I.R. 44, all in Township 28, Range 1 East; Sections 1-18 inclusive, 23, 24, 25, 26, 35, and 36 and fractional sections 19, 20, 21, 22, 27, and 34 lying outside Indian Reserve I.R. 44, excluding Lake Winnipeg, all in Township 28, Range 2 East; all of Township 28, Range 3 East; all of Township 28, Ranges 4 East and 5 East, excluding Lake Winnipeg; Sections 9-36 inclusive, the north half and fractional southeast quarter of Section 1, lying outside Indian Reserve I.R. 44, the fractional west half of Section 2 lying outside Indian Reserve I.R. 44, fractional sections 3, 4 and 5 lying outside Indian Reserve I.R. 44, the south half and northeast quarter of Section 6, the north half and southeast quarter of Section 7, the south half of Section 8, all in Township 29, Range 1 East; Sections 1, 2, 12, 29, 30, fractional Section 6 lying outside Indian Reserve I.R. 44, the southwest quarter of Section 7, the south half and legal subdivisions 11 and 12 of Section 18, fractional Section 19 and 20, excluding patented land, fractional Section 31 excluding Indian Reserve I.R. 1C, excluding Lake Winnipeg, all in Township 29, Range 2 East; all of Township 29, Range 3 East, excluding Lake Winnipeg, all of Township 29, Range 4 East, all of Township 29, Range 5 East and 6 East, excluding Lake Winnipeg; all of Township 30, Range 2 East lying within Forest Management Unit #40 and excluding Lake Winnipeg; all of Township 30, Range 3 East, excluding Lake Winnipeg; all of Township 30, Range 4 East; all of Township 30, Range 5 East, excluding Lake Winnipeg; all of Township 30, Range 6 East lying within Forest Management Unit #40 and excluding Lake Winnipeg; all of Township 31, Range 2 East lying within Forest Management Unit #40 and excluding Lake Winnipeg; all of Township 31, Range 3 East, excluding Lake Winnipeg; all of Township 31, Range 4 East, excluding Matheson Island and Lake Winnipeg; all of Township 31, Range 5 East, excluding Lake Winnipeg; all of Township 32, Range 3 East, excluding Lake Winnipeg; all of Township 32, Range 4 East, excluding Matheson Island and Lake Winnipeg; all of Township 32, Range 5 East lying within Forest Management Unit #40 and excluding Lake Winnipeg; all of Township 33, Range 3 East, excluding Lake Winnipeg.

## APPENDIX 2. SOIL CAPABILITY CLASSIFICATION FOR AGRICULTURE

### THE MINERAL SOIL CAPABILITY CLASSIFICATION FOR AGRICULTURE

The capability classification is one of a number of interpretive groupings for agriculture or other purposes that may be made from Soil Survey data. In this classification the mineral soils are grouped into seven classes on the basis of their limitation for agricultural use. The first three classes are considered capable of sustained production of common field crops. The fourth class is physically marginal for sustained arable agriculture. The fifth class is capable of use only for permanent pasture and hay. The sixth class is capable of use only for wild pasture. The seventh class is for soils and land types considered incapable of use for arable agriculture or permanent pasture. While soil areas in classes one to four are capable of use for cultivated field crops, they are also capable of use for permanent pasture or forage production. However, it does not always hold true that high capability land for annual crop production have high capability for forages.

This capability classification has been applied to virgin soils as well as to presently cultivated lands, with the exception of organic soils.

The soil capability classification for agriculture is a suitability and not a productivity classification, although one often reflects the other. The classification reflects the kinds and degree of limitation associated with the management of the land for agricultural purposes.

### ASSUMPTIONS

The soil capability classification for agriculture is based on certain assumptions which must be understood in applying this interpretive classification in order to derive full benefit from such information and avoid making erroneous deductions. These assumptions are:

1. The soil capability of combinations of climate and soil characteristics, on limitations in use of the soils for agriculture, and their general productive capability for common field crops. Shrubs, trees or stumps are not considered as limitations unless it is unfeasible to remove them.

2. Good soil management practices that are feasible and practical under a largely mechanized system of agriculture are assumed.

3. The soils within a capability class are similar with respect to degree, but not to kind of limitations in soil use for agricultural purposes. Each class includes many different kinds of soil and many of the soils within any one class may require different management and treatment. The subclass provides information on the kind of limitation and the class indicates the intensity of the limitation. Capability Class 1 has no sub-classes. Information for specific soils is included in soil survey reports and in other sources of information.

4. Soils considered feasible for improvement by draining, irrigating, stone removal, altering soil structure, or protecting from water overflow, are classified according to their continuing limitations or hazards in use after the improvements have been made. The term "feasible" implies that it is within present day economic possibility for a farmer to make such improvements. If a major reclamation project is required and is installed, the soils are grouped according to the soil and climatic limitations that continue to exist. A general guide to what is considered a major reclamation project is that it requires co-operative action among farmers or between farmers and governments.

   Minor dams, small dykes, or field conservation measures are not included.

5. The capability classification of the soils in an area may be changed when major reclamation works are installed that permanently change the limitations in use for agriculture.

6. Distance to market, kind of roads, location, size of farms, characteristics of land-ownership and cultural patterns, and the skill or resources of individual operators are not criteria for capability groupings.

7. Capability groupings are subject to change as new information about the behaviour and responses of the soils becomes available.

CAPABILITY CLASSES

*Class 1 - Soils in this class have no significant limitations in use for crops.*

Soils in Class 1 are level or have very gentle slopes, they are deep, well to imperfectly drained and have a good water-holding capacity. They are easily maintained in good tilth and productivity, and damage from erosion is slight. They are moderately high to high in productivity for a wide range of field crops adapted to the region.

*Class 2 - Soils in the class have moderate limitations that restrict the range of crops or require moderate conservation practices.*

Soils in Class 2 are deep and have a good water-holding capacity. The limitations are moderate and the soils can be managed and cropped with little difficulty. The soils are moderately high to high in productivity for a fairly wide range of field crops adapted to the region.

The limitation of soils in the class may be any one of the following: adverse regional climate; moderate effects of accumulative undesirable characteristics; moderate effects of erosion; poor soil structure or slow permeability; low fertility correctable with consistent moderate applications of fertilizers; gentle to moderate slopes; occasional damaging overflow; and wetness correctable by drainage but continuing as a moderate limitation.

Soils in this class are not generally suited to as wide a range of crops as the soils in Class 1. Also more intensive conservation measures, tillage practices, or special soil-conserving systems may be required. The combinations of practices vary from place to place depending on the climate, soil and regional cropping systems.

*Class 3 - Soils in this class have moderately severe limitations that restrict the range of crops or require special conservation practices.*

Soils in Class 3 have more severe limitations than those in Class 2 and conservation practices are more difficult to apply and maintain. Under good management these soils are fair to moderately high in productivity for a fairly wide range of field crops adapted to the region.

In this case the limitations that restrict cultivation are ease of tillage, planting and harvesting, the choice of crops, the application and maintenance of conservation practices, or a combination of two of those described under Class 2 or one of the following: moderate climatic limitations including frost pockets; moderately severe effects of erosion; intractable soil mass or very slow permeability; low fertility correctable with consistent heavy applications of fertilizers; moderate to strong slopes; frequent overflow accompanied by crop damage; poor drainage resulting in crop failures in some years; low water-holding capability or slowness in release of water to plants; stoniness sufficiently severe to seriously handicap cultivation and necessitating some clearing; restricted rooting zone; moderate salinity.

Each soil in this class may have one or more alternative uses or practices required for use but the alternatives may be fewer than for soils in Class 2.

*Class 4 - Soils in this class have severe limitations that restrict the range of crops or require special conservation practices or both.*

Soils in Class 4 have such limitations that they are only suitable for a few crops, or the yield for a range of crops is low, or the risk of crop failure is high. The limitations may seriously affect such farm practices as the timing and ease of tillage, planting and harvesting, and the application and maintenance of conservation practices. These soils are low to medium in productivity for a narrow range of crops but may have higher productivity for a specially adapted crop.

The limitations include the adverse effects of a combination of two or more of those described in Classes 2 and 3 or one of the following: moderately-severe climate; very low water-holding capacity; low fertility difficult or unfeasible to correct; strong slopes; severe past erosion; very intractable mass of soil or extremely slow permeability; frequent overflow with severe effects on crops; severe salinity causing some crop failures; extreme stoniness requiring considerable clearing to permit annual cultivation; very restricted rooting zone, but more than one foot of soil over bedrock or an impermeable layer.

Class 4 soils in subhumid and some aird regions may produce good yields of regionally cultivated crops in years of high rainfall; low yields in years of average rainfall and failures in years below average rainfall. During years of low precipitation even though no crop is expected, special management practices are required to minimize wind erosion, maintain productivity and conserve moisture. These measures include emergency tillage and crops used only for the primary purpose of preventing soil deterioration. These treatments and others must be applied more frequently and more intensively than on soils in Class 3.

*Class 5 - Soils in this class have very severe limitations that restrict their capability to producing perennial forage crops; but improvement practices are feasible.*

Soils in Class 5 have such serious soil, climatic or other limitations that they are not capable of use for sustained production of annual field crops. However, they may be improved by the use of farm machinery for the production of native or tame species of perennial forage plants. Feasible improvement practices include clearing of bush, cultivation, seeding, fertilizing and water control.

The limitations in Class 5 include the adverse effects of one or more of the following: severe climate; low water-holding capacity; severe past erosion; steep slopes; very poor drainage; very frequent overflow; severe salinity permitting only salt tolerant forage crops to grow; stoniness or shallowness to bedrock that make annual cultivation impractical.

Some soils in Class 5 can be used for cultivated field crops provided unusually intensive management is used. Some of the soils in this class are also adapted to special crops such as blueberries, orchard crops, or the like, requiring soil conditions unlike those needed by the common crops. Cultivated field crops may be grown in Class 5 areas where adverse climate is the main limitation but crop failures occur under average conditions.

*Class 6 - Soils in this class are capable only of producing perennial forage crops, and improvements practices are not feasible.*

Soils in Class 6 have some natural sustained grazing capacity for farm animals but have such serious soil, climatic or other limitations as to make impractical the application of improvement practices that can be carried out in Class 5. Soils may be placed in this class because their physical nature prevents improvement through the use of farm machinery, or the soils are not responsive to improvement practices or because of a short grazing season, or because stock watering facilities are inadequate. Such improvement as may be effected by seeding and fertilizing by hand or by aerial methods shall not change the classification of these soil areas.

The limitations in Class 6 include the adverse effects of one or more of the following: very severe climate; very low water-holding capacity; very steep slopes, very severely eroded land with gullies too numerous and too deep for working with machinery; severely saline land producing only edible, salt-tolerant, native plants; very frequent overflow allowing less that 10 weeks effective grazing; water on the surface of the soil for most of the year; stoniness or shallowness to bedrock that makes any cultivation impractical.

*Class 7 - Soils in this class have no capability for arable culture or permanent pasture.*

The soils or lands in Class 7 have limitations so severe that they are not capable of use for arable culture or permanent pasture. All classified areas (except organic soils) not included in Classes 1 to 6 shall be placed in this class. Bodies of water too small to delineate on the map are included in this class.

Class 7 soils may or may not have a high capability for trees, native fruits, wildlife and recreation. Hence no inferences can be made as to the capability of the soils and land types in this class beyond the scope of their capability for agriculture.

## THE CAPABILITY SUBCLASSES

*Undersirable soil structure and/or low permeability (D) -*

This subclass is used for soils difficult to till, or which absorb water very slowly or in which the depth of rooting zone is restricted by conditions other than a high water table or consolidated bedrock.

*Erosion (E) -*

Subclass E includes soils where damage from erosion is a limitation to agricultural use. Both wind and water erosion are recognized. The classification is based on the premise that soil productivity is lowered with the loss of topsoil and that fields cut by gullies are more expensive to farm.

*Low Fertility (F) -*

This subclass is made up of soils having low fertility that either is correctable with careful management in the use of fertilizers and soil amendments or is difficult to correct in a feasible way. The limitation may be due to lack of available plant nutrients, high acidity or alkalinity, low exchange capacity, or presence of toxic compounds.

*Inundation by streams or lakes (I) -*

This subclass includes soils subjected to inundation causing crop damage or restricting agricultural use.

*Moisture Limitation (M) -*

This subclass consists of soils where crops are adversely affected by droughtiness owing to inherent soil characteristics. They are usually soils with low water-holding capacity. Generally the more coarse the texture, the lower the capability class.

*Salinity (N) -*

This subclass includes soils with enough soluble salts to adversely affect crop growth or restrict the range of crops that may be grown. Such soils are not placed higher than Class 3.

*Stoniness (P) -*

This subclass is made up of soils sufficiently stony to significantly hinder tillage, planting, and harvest operations. Stony soils are usually less productive than comparable non-stony soils.

*Consolidated bedrock (R) -*

This subclass includes soils where the presence of bedrock near the surface restricts their agricultural use. As a general rule, where depth to bedrock is less than 12 inches the soil will not be rated higher than Class 5 and where depth to bedrock is more than 3 feet the class rating will not be affected except under irrigation.

*Topography (T) -*

This subclass is made up of soils where topography (slope and pattern) is a limitation in agricultural use. Both the percent of the slope and the pattern of frequency of slopes in different directions are important factors in increasing the cost of farming over that of smooth land, in decreasing the uniformity of growth and maturity of crops, and in increasing the hazard of water erosion. The following guidelines illustrate the slope tolerance within each land class. In this scheme, capital letters are used for single slopes (regular surface) and lower case letters are used for multiple slopes (irregular surface).

---------- Slope Patterns: ----------

| Simple topography Single Slopes (regular surface) | | Complex topography Multiple Slopes (irregular surface) |
|---|---|---|
| A. | depressional to level | a. nearly level |
| B. | very gently sloping | b. gently undulating |
| C. | gently sloping | c. undulating |
| D. | moderately sloping | d. gently rolling |
| E. | strongly sloping | e. moderately rolling |
| F. | steeply sloping | f. strongly rolling |
| G. | very steeply sloping | g. hilly |
| H. | extremely sloping | h. very hilly |

| | % Slope | Pattern |
|---|---|---|
| Class 1 | 0- 5% | Aa; Bb; C |
| Class 2T | 2- 5% | c |
| | 6- 9% | D |
| Class 3T | 6- 9% | d |
| | 10-15% | E |
| Class 4T | 10-15% | Ee |
| Class 5T | 16-30% | Ff |
| Class 6T | 31-60% | Gg |
| Class 7T | 60+% | Hh |

*Excess Water (W) -*

This subclass is made up of soils where excess water, apart from that brought about by inundation, is a limitation in their use for agriculture. Excess water may be the result of poor soil drainage, high water table, seepage or runoff from surrounding areas. Usually soils needing drainage have some permanent limitation that precludes placing them in Class 1 even after drainage.

*Adverse soil characteristics (S) -*

This subclass is used on some of the 1:250,000 scale maps in place of subclasses D, F, M or N either individually or collectively. While it is desirable to denote the limitations as specifically as possible, it was found impractical to show more than two subclasses for each class.

*Cumulative minor characteristics (X) -*

This subclass is made up of soils having a moderate limitation caused by the cumulative effect of two or more adverse characteristics which singly are not serious enough to affect the class rating.

B. THE ORGANIC SOIL CAPABILITY FOR AGRICULTURE

The organic soils in the Red Rose - Washow Bay Area have been rated for: a) potential" agricultural capability, and b) degree of development difficulty involved in achieving this potential. The agricultural suitability of most of these soils requires reclamation or development from their native state and that most organic soils in their native state have little or no value for agriculture. Rating degree of development difficulty takes into consideration intrinsic characteristics of the soils affecting development and also associated costs required for development.

The capability classes of organic soils established not only reflect potential for agricultural use but also identify the continuing limitation of these soils for agriculture after reclamation has been implemented or is assumed to have been implemented.

ASSUMPTIONS

The capability classification of organic soils for agriculture is based on certain assumptions which must be understood by those using capability maps or making capability ratings for various crops.

1. Capability ratings for drained conditions assumes continued subsidence rates of 3/4 inch to 2 inches annually; hence, depth of the organic layer and the nature of underlying mineral substrate is taken into account in evaluating organic soils for agriculture.

2. The organic capability grouping is an interpretive classification designed to assess the limitation of individual organic soils to development for production of cereal grains, forage and pasturage.

3. Good soil management, including drainage, control of subsidence, wind erosion, crop growing and conservation practices that are feasible under a mechanized system of agriculture are assumed.

4. The soils within a capability class are similar with respect to the degree of soil limitation but not necessarily similar with respect to the kind of limitation. The subclass provides information on the kind of limitation or hazard and the class indicates the intensity of the limitation. Organic soils in Class 1 have the least limitations and Class 7 have the most severe.

5. Organic soils which have been reclaimed and developed for agriculture are classified according to any continuing limitations which may affect the production of agricultural crops. Soils in the natural state are classified not only for the agriculture capability but also according to the apparent degree of difficulty in reclamation and development.

6. The location, distance to market, efficiency of transport, financial state of the market, farm size and sociological influences do not constitute criteria for capability groupings.

7. Capability classes and capability definitions are subject to change as new information and methods concerning the manipulation of organic soils become available. At the present time, capability groupings do not have the benefit of extensive regional research and management experience in their use for agriculture as in the case of mineral soils.

DEVELOPMENT DIFFICULTY RATINGS FOR ORGANIC SOILS

In addition to evaluation of potential capability, an attempt was made to rate relative degree of difficulty of carrying out reclamation or development on organic soils. These ratings are based on evaluation of the present or natural state of organic soils. The degree of development difficulty ratings are important in priorizing areas of organic soils for reclamation. Three relative degrees of difficulty in overcoming limitations or hazards to use are recognized.

1. Minor Development Difficulty

   Only minor reclamation is required to overcome limitations to use. Minor reclamation is considered to be those operations which can be carried out by a single operator and which do not require cooperation between adjoining operators. Such operations would include leveling rough surfaces, removal of surface woody layers and land clearing.

2. Major Development- Reclamation Warranted

   Major reclamation is required but is warranted when soil potential is high. Major reclamation is that requiring cooperation between adjoining operators or outside financial assistance or both. Major reclamation operations include drainage, construction of water control works or correction of very low pH or very high pH.

3. Major Development Difficulty - Reclamation Seldom Warranted

   These organic soils can be developed only by very large reclamation projects. Major reclamation is seldom warranted here because the hazards are so serious that they constitute some continuing limitation which reduces the agricultural capability.

PHYSICAL FEATURES UTILIZED TO DETERMINE DEVELOPMENT DIFFICULTY RATING OF ORGANIC SOILS

| Symbol | Physical Features and Guidelines to Use |
|---|---|
| V | Vegetative Cover |
| W | Excess Water |
| I | Inundation |
| T | Surface Roughness |
| L | Coarse Wood |
| H | Degree of Decomposition |
| D | Depth of Organic Materials |

DESCRIPTION OF CLASSES

*Class 03- Organic soils in this class have moderately severe limitations that restrict the range of crops that can be grown or that require special development and management practices.*

They are usually underlain by calcareous clay textured lacustrine sediment.

1. Soil Name — Cayer, Kirco
   Classification — 03W-1

   03 - a class 3 organic soil
   W - excess water
   1 - minor development difficulty, can be handled by the farm operator

2. Soil Name — Stead
   Classification — 03W-2

   03 - a class 3 organic soil
   W - excess water
   2 - major development difficulty. Reclamation warranted, would require cooperation between farm operators and possible outside financial assistance in drainage and water control systems.

*Class 04- Organic soils have severe limitations which restrict the range of crops which require special development and management practices.*

1. Soil Name Baynham, Okno, Rat River
   Classification 04WL-2

   04 - class four organic soil
   W - excess water
   L - coarse wood vegetation
   2 - major degree of development difficulty rating because of dense forest cover, excess water and a high content of coarse woody material in the organic material itself.
   Under lying material usually fine textured lacustrine sediments.

2. Soil Name Macawber
   Classification 04WD-2

   04 - class four organic soil
   W - excess water
   D - depth of organic - 5-10 feet
   2 - Major degree of development difficulty due to location and excess water.
   Underlain by very stony till material.

*Class 05- Organic soils of this class have severe limitations that restrict use of this soils to production of perennial forage or other specially adapted crops.*

1. Soil Name Crane Complex
   Classification 05WD-1

   05 - class five organic soil
   W - excess water
   D - depth of organic materials 2-5 feet
   1 - minor degree of development difficulty.
   Underlain by very strong till.

2. Soil Name Bradbury
   Classification 05WL-1

   05 - class five organic soil
   W - excess water
   L - coarse wood vegetation
   2 - Major development difficulty, these organic soils are 5-10 feet thick. The stony glacial till underlying these soils and the woody vegetation decrease their suitability for agriculture use and development.

*Class 06- Organic soils in this class are capable only of producing indigenous crops and improvement practices are not feasible.*

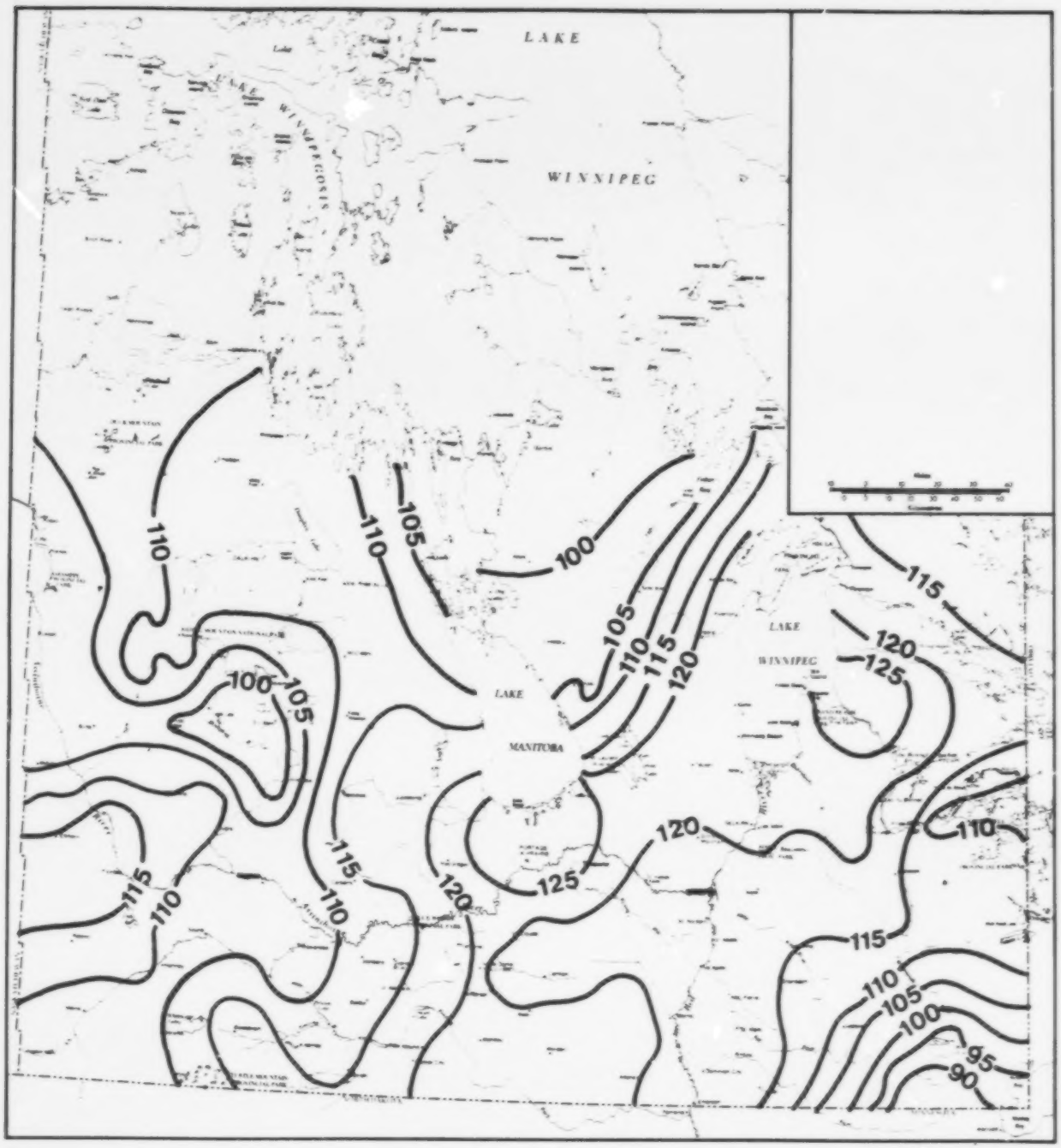
1. Soil Name Grindstone Complex
   Classification 06WD-2

   06 - class six soil
   W - excess water
   D - depth of organic materials 2-5 feet
   2 - Major development difficulty - stony glacial till occuring near the surface decreases this soils agriculture use and development.

2. Soil Name Denbeigh, Julius, Kilkenny, Molson, Sand River and Sproule
   Classification 06WF-2

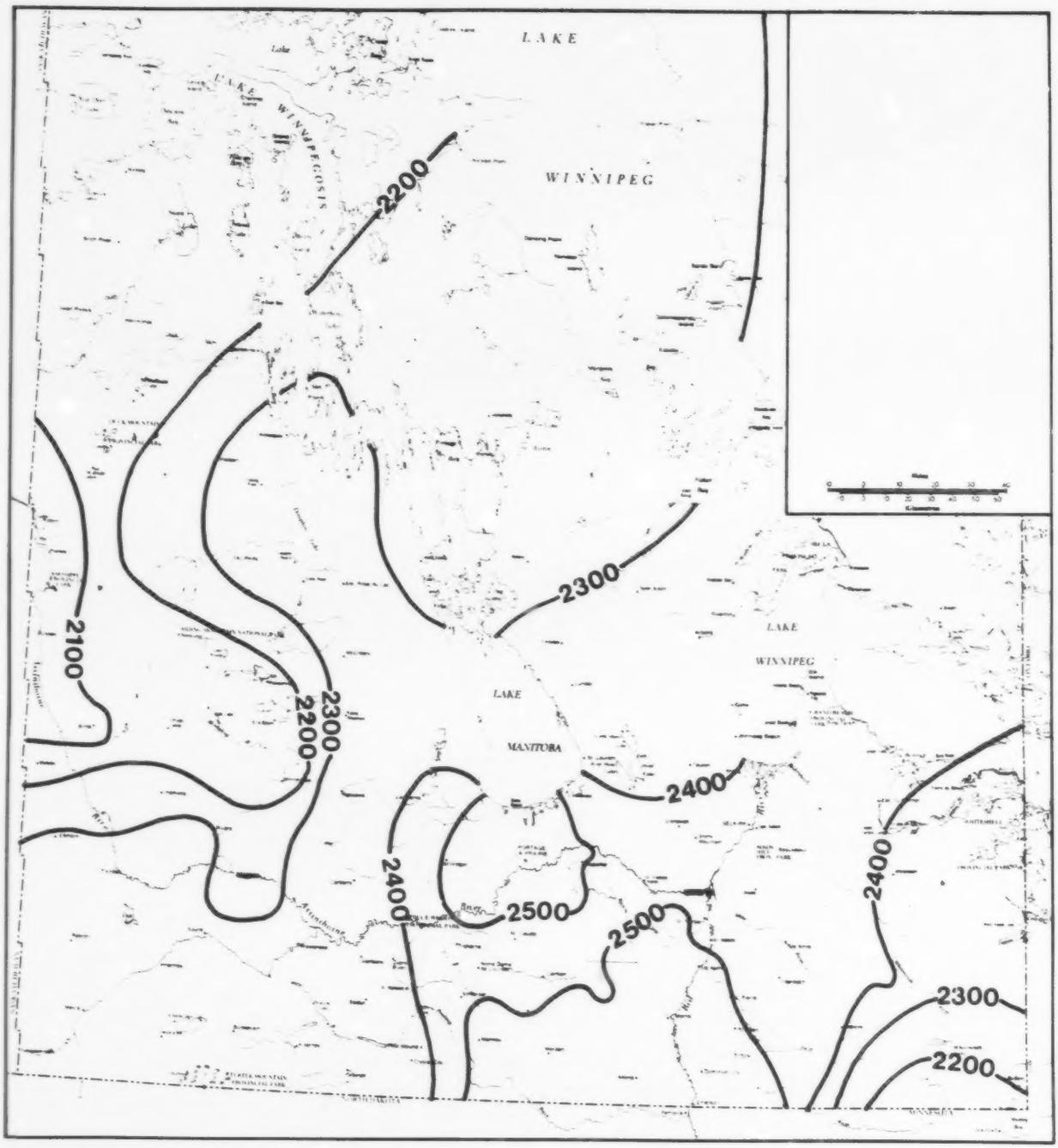
   06 - class six organic soil
   W - excess water
   F - acidic
   2 - extremely acidic Sphagum mosses ranging from 5 to greater than 10 feet in depth. This material contains some woody material. Major development difficulty and normally it is not feasible to develop these since their value for agriculture is not high.

*Class 7 - Organic soils of this class have no potential for agriculture.*




**Appendix 3**

**Average Length of the Frost-Free Period above 0°C.**




**Appendix 3.**

**Average Accumulated Number of Corn Heat Units.**

APPENDIX 4. SUMMARY OF WOOD DELIVERED TO PINE FALLS FROM 1972-73 to 1981-82 BY BARGE AND TRUCK FROM THE INTERLAKE REGION[1]

| Year | | Volume[2] (Cords) | Total Volume Cords |
|---|---|---|---|
| 1972-73 | F.D. Reimer | 900.00 | |
| | W. Kurian Construction | 3,288.33 | 4,188.33 cords |
| 1973-74 | Reimer & Sons | 1,255.24 | |
| | Kurian Construction | 3,526.22 | 4,781.46 cords |
| 1974-75 | H.R. Reimer | 1,600.76 | |
| | F.D. Reimer | 2,513.21 | 4,113.97 cords |
| 1975-76 | Grand Rapids | 795.27 | |
| | R.D. Reimer | 2,486.90 | |
| | H.R. Reimer | 1,838.16 | 5,120.33 cords |
| 1976-77 | - Nil - | | |
| 1977-78 | Jackhead Indian Band | 1,487.17 | |
| | Matheson Island | 131.68 | |
| | Pine Dock | 723.63 | |
| | F.D. Reimer | 1,093.15 | |
| | Marine Transport Limited | 737.85 | |
| | F.D. Reimer | 658.00 | 4,831.48 cords |
| 1978-79 | Harms Bros. | 1,144.42 | |
| | Jackhead Indian Band | 1,446.02 | |
| | Marine Transport Limited | 219.38 | |
| | L. Nagy | 531.16 | |
| | Northland Contracting | 419.00 | |
| | Pine Dock | 325.58 | |
| | F.D. Reimer | 1,931.17 | 6,016.73 cords |
| 1979-80 | Jackhead Indian Band | 1,467.57 | |
| | L. Nagy | 412.75 | |
| | Pine Dock | 565.43 | |
| | Marine Transport Limited | 210.08 | |
| | Northland Contracting | 294.40 | |
| | F.D. Reimer | 813.55 | |
| | H.R Reimer | 378.08 | 4,141.86 cords |
| 1980-81 | R. Terry | 2,210.64 | |
| | L. Nagy | 866.38 | |
| | Marine Transport Limited | 3,544.28 | |
| | G. Dupont | 1,110.52 | |
| | Koostatak | 12.09 | |
| | Jackhead | 827.87 | |
| | F. Swark | 461.51 | |
| | Pine Dock | 694.45 | |
| | F.D. Reimer | 662.01 | |
| | P. Egesz | 460.00 | 10,958.56 cords |
| 1981-82 | R. Terry | 1,523.55 | |
| | L. Nagy | 531.80 | |
| | Marine Transport Limited | 3,354.61 | |
| | G. Dupont | 308.74 | |
| | Koostatak | 2,264.26 | |
| | Jackhead | 863.69 | |
| | Pine Dock | 397.08 | |
| | F.D. Reimer | 934.75 | |
| | P. Egesz | 260.00 | |
| | H.R. Rimer | 320.00 | |
| | B & B Nagy | 192.99 | |
| Truckwood | | | |
| | Peguis | 959.10 | |
| | G. Dupont | 98.61 | |
| | R. Terry | 260.61 | |
| | Koostatak | 242.67 | 12,512.61 cords |

1. Personal Communication, R. Yatkowsky, I.W.S.A. Supervisor Abitibi-Price Inc., Letter, June 1, 1982

2. The volumes indicated are from Management Unit 40-45 and have not been split out according to cut areas. These volumes do not reflect the volume of wood supplied to other concerns, i.e., Building Products, Spruce Products, South East Forest Products, Colonial Log Mills, private lumber producers, communities, Quota holders, etc.

APPENDIX 5. ALLOCATION HOLDERS OPERATING IN THE STUDY AREA

NAME

Abitibi-Price Incorporated

Paul Egesz

Leonard Johnson

Norman Johnson

John Selkirk

John Kovich

Pine Dock Community Development Corporation (Special Allocation)

Matheson Island Community Council (Special Allocation)

VOLUMES COMMITTED

Total Softwoods committed for harvest annually = 10,187.69$^{m}$

Total Hardwoods committed for harvest annually = 1,463.47$^{m}$

APPENDIX 6. GROSS AND NET MERCHANTABLE VOLUMES FOR THE STUDY AREA (1980 FOREST INVENTORY)

| Species | Cutting Classes 3-5[1] Gross Volume ($m^3$) | Net Volume[2] ($m^3$) |
|---|---|---|
| Jack Pine | 289,360 | 245,920 |
| Black Spruce | 748,330 | 674,780 |
| White Spruce | 269,870 | 243,100 |
| Balsam Fir | 313,190 | 236,860 |
| Tamarack | 72,010 | 64,720 |
| Softwood Total | 1,692,760 | 1,465,380 |
| Trembling Aspen | 1,196,250 | 721,700 |
| Balsam Poplar | 153,190 | 92,450 |
| White Birch | 203,730 | 123,060 |
| Other Hardwoods | 4,000 | 2,420 |
| Hardwood Total | 1,557,170 | 939,630 |
| Total Softwood & Hardwood | 3,249,930 | 2,405,101 |

1. Cutting is based on size, vigour, state of development and maturity of a stand for harvesting purposes.

Cutting Class 0 - Forest land not restocked following fire, cutting, windfall or other major disturbances (hence, potentially productive land). Some reproduction or scattered residual trees (with net merchantable volume less than 20 $m^3$ per hectare) may be present.

Cutting Class 1 - Stands which have been restocked either naturally or artificially. There may be scattered residual trees present as in Cutting Class 0. To be in Cutting Class 1 the average height of the stand must be less than 3 meters (3m).

Cutting Class 2 - Advanced young growth of post size, with some merchantable volume. The average height of the stand must be over 3 meters in order to be in this cutting class.

Cutting Class 3 - Immature stands with merchantable volume growing at or near their maximum rate, which definitely should not be cut. The average height of the stand should be over 10 meters and the average diameter should be over 9.0 centimeters (9.0 cm) at D.b.h. (1.3 m).

Cutting Class 4 - Mature stands which may be cut as they have reached rotation age.

Cutting Class 5 - Overmature stands, which should be given priority in cutting.

The Riverton burn area is currently coded as cutting Class 0. As natural regeneration increases within the burn area, this coding will change to cutting class 1.

2. Net Merchantable Volume is the volume of all species with diameter 9.1 cm diameter at breast height and larger less the respective cull factors. A summary of cull factors is as follows:

| Species | Cull Factors 0-24 cm D.b.h. | 25 cm+ D.b.h[1] |
|---|---|---|
| Jack Pine | 10% | 15% |
| Black Spruce | 5% | 5% |
| White Spruce | 5% | 5% |
| Balsam Fir | 25% | 40% |
| Tamarack Larch | 10% | 10% |
| Hardwoods | 20% | 40% |

1. Diameter at breast height

APPENDIX 7. CANADA LAND INVENTORY LAND CAPABILITY FOR FORESTRY FOR THE AREA OF FORESTRY INTEREST (MAP 18)

| Location Twp. | Reg. | Capability Class: Class 3 (Acres) ws | Class 4 (Acres) ws | Class 5 (Acres) ws | Class 5 (Acres) jp | Class 5 (Acres) bs | Class 5 (Acres) ws/jp | Class 6 (Acres) jp | Class 6 (Acres) bs | Class 6 (Acres) ws/jp | Class 7 (Acres) bs | Nonproductive (Acres) water, roads, etc. | Township Totals in area of interest[1] (Acres) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 | 2E | | 31 | 125 | | | | | | | | | 156 |
| 25 | | | 783 | 5,017 | | | 710 | | 1,236 | | 3,614 | | 11,360 |
| 26 | | | 2,615 | 2,068 | | | 5,402 | | 1,172 | | 10,503 | | 21,760 |
| 27 | | | 2,285 | 85 | | | 5,384 | | | | 8,205 | | 15,959 |
| 28 | | | 3,704 | 93 | | | 5,668 | | | | 8,802 | 2,023 | 19,660 |
| 29 | | | | | | | | | | | 412 | | 412 |
| 30 | | | 1,557 | | | | | | | | 108 | | 1,665 |
| 31 | | | 2,491 | | | | | | 156 | | 933 | 14,497 | 18,077 |
| 26 | 3E | 746 | 1,880 | 2,813 | | 73 | | | 863 | | 5,145 | | 11,520 |
| 27 | | 878 | 2,442 | 3,145 | | 925 | | | 240 | | 8,330 | | 15,962 |
| 28 | | 31 | 5,048 | 1,160 | | 3,949 | | | 1,943 | | 10,909 | | 23,040 |
| 29 | | 60 | 4,445 | 2,189 | 543 | | | | 1,368 | | 9,744 | 4,691 | 23,040 |
| 30 | | 439 | 1,835 | 1,647 | 439 | 4,371 | | | 753 | | 6,190 | 7,366 | 23,040 |
| 31 | 3E | | 3,566 | 96 | 129 | | 2,367 | | 129 | | 4,753 | 12,000 | 23,040 |
| 32 | | | 669 | 218 | | | | | | | 1,448 | 20,705 | 23,040 |
| 33 | | | 498 | 47 | | | | | 203 | | 2,055 | 20,237 | 23,040 |
| 26 | 4E | | 1,118 | 1,521 | | | 30 | | 1,419 | | 3,334 | 4,098 | 11,520 |
| 27 | | | 2,451 | 581 | | | 1,530 | | 1,822 | | 5,865 | 3,707 | 15,956 |
| 28 | | 572 | 3,107 | 953 | | | 1,646 | | 175 | | 15,322 | 1,265 | 23,040 |
| 29 | | 1,820 | 4,267 | 420 | | | 156 | | 436 | | 11,893 | 4,048 | 23,040 |
| 30 | | 439 | 2,274 | 1,365 | | | 4,388 | | | | 14,417 | 157 | 23,040 |
| 31 | | | 3,056 | 723 | | | 2,812 | | 308 | | 9,691 | 6,450 | 23,040 |
| 32 | 4E | | 1,432 | 530 | | | 156 | | | | 840 | 19,602 | 22,560 |
| 28 | 5E | | 915 | 611 | | | | | | | 2,441 | 19,073 | 23,040 |
| 29 | | | 1,505 | 783 | | | 847 | | 2,525 | | 9,387 | 7,993 | 23,040 |
| 30 | | 220 | 1,025 | | | 126 | 3,253 | 283 | 692 | 566 | 12,934 | 3,941 | 23,040 |
| 31 | | | 3,032 | | | 375 | 1,151 | | 1,692 | | 5,593 | 11,197 | 23,040 |
| 32 | | | 1,153 | 155 | | | 93 | | | | 1,557 | 20,082 | 23,040 |
| 29 | 6E | | | | | | 94 | 31 | | | | 22,915 | 23,040 |
| 30 | | | | | | | 1,868 | 623 | 623 | | 31 | 19,895 | 23,040 |
| All (Acres) Townships | | 5,205 | 58,554 | 26,345 | 1,111 | 9,819 | 37,555 | 937 | 17,755 | 566 | 174,456 | 225,942 | 558,245 |
| All Townships (Hectares) | | 2,108 | 23,714 | 10,670 | 450 | 3,977 | 15,209 | 380 | 7,191 | 299 | 70,655 | 91,506 | 226,089 |

1. Excluding WMA's, patented land, Indian Reserve and Community Pasture

2. ws - White Spruce, jp - Jack Pine, bs - Black Spruce

APPENDIX 8. MEAN ANNUAL INCREMENT, ROTATION FACTORS

Forest Increment

The mean annual increment (MAI) is defined as the average annual volume growth produced by a forest stand over its rotation. The capability of the growing site, density of stocking, species composition, age and the effect of post treatments, fires, insect or disease epidemics can vary the MAI accordingly.

Growth data expressed as MAI are currently available only for forest types in Cutting Class 4 (mature timber) and in Density Classes 3 and 4.

MEAN ANNUAL INCREMENT[1]

| Working Group | Increment ($m^3$/ha) |
|---|---|
| White Birch | 1.79 |
| Balsam Poplar | 2.03 |
| White Aspen | 2.14 |
| Black Spruce | 1.52 |
| White Spruce | 1.73 |
| Jack Pine | 1.72 |
| Balsam Fir | 1.54 |

1. Based on the increment of cutting Class 4 or mature timber in crown closure Classes 3 and 4. Site class one.

2. Crown closure classes - the percentage of ground area covered by the vertically projected tree crown areas: Crown class 3 - 51% to 70% crown closure; 4 - 71% and over.

Rotation

In any given situation there is an optimum size and age to which timber should be grown. The period of years required to grow a crop of timber to this specified condition of either economic or natural maturity is known as the rotation. The following summarizes the rotation age required to reach maturity in the Interlake Region.

| | ROTATION IN YEARS | |
|---|---|---|
| Species | Site[1] | Years |
| Jack Pine | All Sites | 60 |
| Black Spruce | Site 1 | 80 |
| | Sites 2 & 3 | 140 |
| White Spruce | All Sites | 80 |
| Balsam Fir | All Sites | 60 |
| Tamarack Larch | Site 1 | 90 |
| | Site 2 | 140 |
| Hardwoods | All Sites | 60 |

1. Site - The complex of physical and biological factors for an area which determines what forest or other vegetation it may carry.

   Site class 1 represents best growing conditions whereas site class 2 and 3 relate to poorer productivity capabilities due to lack of moisture or excessive moisture.

APPENDIX 9. EXAMPLE EFFECT ON ANNUAL ALLOWABLE CUT IF TOWNSHIP 28, RANGE 4E WAS REMOVED FROM FORESTRY USE, AUGUST 23, 1983, FOREST INVENTORY

In this example, if all township 28, range 4E were withdrawn from forestry use, there would be a reduction of the annual allowable cut of 4.8 percent and 5.3 percent for softwoods and hardwoods respectively

| | WORKING GROUP IN HECTARES (PRODUCTIVE) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Provincial Crown Land - Open | Jack Pine | B. Spruce Site 1 | B. Spruce Sites 2&3 | White Spruce | Balsam Fir | T. Larch Site 1 | T. Larch Site 2 | Total Softwood | Trembling Aspen | Balsam Poplar | White Birch | Ash | Total Hardwood | Total Productive |
| M.U. 40 Original | 6,164.1 | 19,611.5 | 13,724.6 | 3,986.2 | 7,125.1 | 106.5 | 1,916.8 | 52,634.8 | 28,750.4 | 140.4 | 515.8 | 3.2 | 30,409.8 | 83,044.6 |
| T .28-4E Removed | 86.5 | 1,018.7 | 758.5 | 242.6 | 382.4 | - | 34.3 | 2,523.0 | 836.4 | - | 5.7 | 3.2 | 845.3 | 3,368.3 |
| Remaining | 6,077.6 | 18,592.8 | 12,966.1 | 3,743.6 | 6,742.7 | 106.5 | 1,882.5 | 50,111.8 | 28,914.0 | 140.4 | 510.1 | - | 29,564.5 | 79,676.3 |

| | THIRD PRACTICAL ANNUAL ALLOWABLE CUT BY SPECIES - CUBIC METERS PER ANNUM | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Provincial Crown Land - Open | Jack Pine | Black Spruce | White Spruce | Balsam Fir | Tamarack Larch | Total Softwood | Trembling Aspen | Balsam Poplar | White Birch | Other Hardwood | Total Hardwood | Total |
| M.U. 40 Original | 6,560 | 15,370 | 7,800 | 6,880 | 110 | 36,720 | 23,680 | 2,320 | 4,830 | 80 | 30,910 | 67,630 |
| T. 28-4E Removed | 160 | 780 | 430 | 390 | - | 1,760 | 1,280 | 120 | 250 | - | 1,650 | 3,410 |
| Remaining | 6,400 | 14,590 | 7,370 | 6,490 | 110 | 34,960 | 22,400 | 2,200 | 4,580 | 80 | 29,260 | 64,220 |
| Percent of AAC Lost | 2.4% | 5.1% | 5.5% | 5.7% | 0% | 4.8% | 5.4% | 5.2% | 5.2% | 0% | 5.3% | 5.0% |

APPENDIX 10. SUPPLY DEMAND OPTIONS - FOREST MANAGEMENT PLAN 1981-2000

Timber Supply - Current Management Level

This shows the diminishing gross benefit resulting from forest management continuing at the existing level.

The renewable timber supply is diminishing with a like effect on the industry and the gross benefits therefrom.

Demand for Timber - No Industry Growth

The level of forest management is increased to match timber supply with demand at the current harvesting level.

There is no opportunity to expand timber harvest in response to demand growth.

The value of shipments is more or less constant at $400 million and direct employment at 5,600 man years.

Demand for Timber - 2% Industry Growth

The level of forest management is increased to provide for timber supply increasing to match increasing demand at 2% per year.

The value of shipments rises to $500 million and direct employment increases to 6,600 man years by the year 2000.

Tax revenue both corporate and individual is estimated to increase from $26.8 million to $32.5 million.

Demand for Timber - Manfor Expansion

This option adds a major expansion by doubling Manfor and its timber demand. Increased forest management will permit meeting the timber demand from the specified area.

This quantum leap would increase the value of shipments from $442 to $575 million in 1990 and to $663 in 2000.

Direct employment would increase by 600 resulting in 7,200 total direct jobs in 2000.

Tax revenue is estimated to increase from $28.8 to $37.4 million in 1990 to $41.1 million in 2000.

APPENDIX II. ANNUAL FOREST INDUSTRY POTENTIAL IN THE WASHOW-FISHER PENINSULA

| | Value in thousands of 1983 dollars | | |
|---|---|---|---|
| | Logging Industry | Primary Manufacturing[6] | Total |
| Based Upon Actual 1980/81[5] | | | |
| Harvest Levels | | | |
| Gross Value of Shipments[1] | 1,179.6 | 3,670.2 | 4,849.8 |
| Gross Provincial Product[2] | 526.9 | 1,526.2 | 2,053.1 |
| Provincial Government Receipts[3] | 52.7 | 152.6 | 205.3 |
| Employment (Man Years)[4] | 14 | 31 | 45 |
| Wet Op I Basis | | | |
| Gross Value of Shipments | 532.7 | 1,657.4 | 2,190.1 |
| Gross Provincial Product | 237.9 | 689.2 | 927.1 |
| Provincial Government Receipts | 23.8 | 68.9 | 92.7 |
| Employment (Man Years) | 6 | 14 | 20 |
| Wet Op II Basis | | | |
| Gross Value of Shipments | 1,924.9 | 5,989.3 | 7,914.2 |
| Gross Provincial Product | 859.9 | 2,490.6 | 3,350.5 |
| Provincial Government Receipts | 86.0 | 249.1 | 335.1 |
| Employment (Man Years) | 23 | 50 | 73 |
| Wet Op III Basis | | | |
| Gross Value of Shipments | 2,195.3 | 6,830.6 | 9,025.9 |
| Gross Provincial Product | 980.6 | 2,840.5 | 3,821.1 |
| Provincial Government Receipts | 98.1 | 284.1 | 382.1 |
| Employment (Man Years) | 26 | 57 | 83 |

1. Gross Value of Shipments - Five year average values (1977-1981) were used for pulpwood, logs and bolts and other products. Adjusted to 1983 dollars by IPI, 1982 - 10.7%, 1983 assumed to be 6%. Assumed product composition as follows: pulpwood 63%, logs and bolts 14%, chips 15%, waste 6%. Derived unit value is $32.46/m$^3$ for logging, $101/m$^3$ for primary manufacturing.

2. Gross Provincial Product - Based upon value added estimates. The method was similar to that used to derive the gross value of shipments. Derived unit value is $14.40/m$^3$ for logging, $42/m$^3$ for primary manufacturing.

3. Provincial Government Receipts - It is assumed that the provincial government raises its own revenues (excluding federal transfer payments) at a rate of 10% of value added.

4. Employment - Based upon a 5 year average rate of 0.39 man years per thousand cubic meters for logging. Comparable factor for primary manufacturing is 0.84/'000m$^3$.

5. Acutal 1980/81 Harvest - was reported as 36,339m$^3$.

6. Primary Manufacturing - industries include sawmills, pulp and paper mills and miscellaneous wood industries.

Note the values presented are qualified by the following:

a) the capitalized values presented in this report are based upon the discounted present value of a 40 year flow of revenues, commencing in 2,000 A.D.

b) it is a broad brush treatment and not an on-site economic impact analysis.

c) value is determined in the content of supply and demand. The demand scenario adopted for this report is that which is the basis for the Forest Management Plan 1981-2000 Alternative demand scenarios would of course change the estimated values.

d) assumptions underlying the Forest Management Plan's outlook include the following:

   i) factor inputs (i.e., labour, capital and resources) are available to support continued growth by the forest industry;

   ii) the Manitoba industry is able to sustain market growth at an average annual rate of 2% - 3% over the term of the plan;

   iii) no technological problems develop;

   iv) the relative cost of accessing the remote forest resources of the northeast confines geographic dispersion of the industry to the forest sections identified by Forestal. (This includes Interlake F.S.).